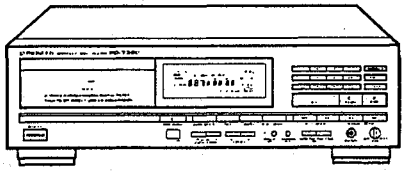
PIONEER
The future of sound and vision.

PION-02593

Service Manual



ORDER NO.
ARP1859

COMPACT DISC PLAYER

PD-7300
PD-7300-S

PD-7300 AND PD-7300-S HAVE FOLLOWING VERSIONS :

Type	Applicable model		Power requirement	Export destination
	PD-7300	PD-7300-S		
KU/CA	○	—	AC120V only	U.S.A and Canada
HEM	○	○	AC220V,240V (switchable) *	European continent
HB	○	—	AC220V,240V (switchable) *	United kingdom
SD	○	—	AC110V,120V – 127V,220V,240V (switchable)	Kingdom of Saudi Arabia and General market

* Change the connection wires from the power transformer to the SWITCH BOARD unit.

- **This service manual is applicable to the PD-7300/KU/CA, HEM, HB, SD and PD-7300-S/HEM types.**
- **For the PD-7300/HEM, HB, SD and PD-7300-S/HEM types, please refer to pages 69.**
- **Ce manuel pour le service comprend les explications en français de réglage.**
- **Este manual de servicio trata del método ajuste escrito en español.**

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IFJ JUNE. 1989

1. SAFETY INFORMATION

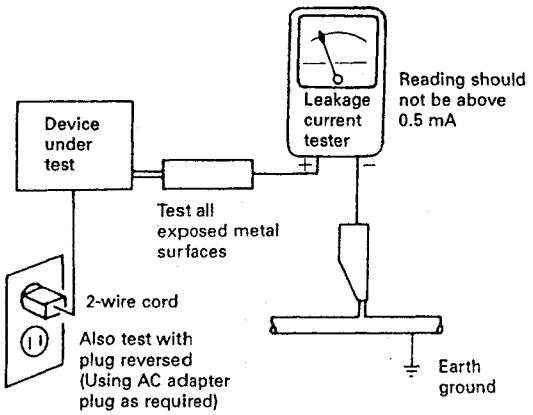
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120 V AC 60 Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5 mA.


Leakage current tester
Reading should not be above 0.5 mA
Device under test
Test all exposed metal surfaces
2-wire cord
Also test with plug reversed (Using AC adapter plug as required)
Earth ground

AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

(FOR EUROPEAN MODEL ONLY)

VAROITUS!
LAITE SISÄLTÄÄ LASERDIODIN, JOKA LÄHETTÄÄ NÄKYMÄTÖNTÄ, SILMILLE VAARALLISTA INFRAPUNASÄTEILYÄ LAITTEEN SISÄLLÄ ON LASERDIODIN LÄHEISYYDESSÄ KUVAN 1. MUKAINEN VAROITUSMERKKI.

LASER
Kuva 1
Lasersateilyn varoitusmerkki

WARNING!
DEVICE INCLUDES LASER DIODE WHICH EMITS INVISIBLE INFRARED RADIATION WHICH IS DANGEROUS TO EYES. THERE IS A WARNING SIGN ACCORDING TO PICTURE 1 INSIDE THE DEVICE CLOSE TO THE LASER DIODE.

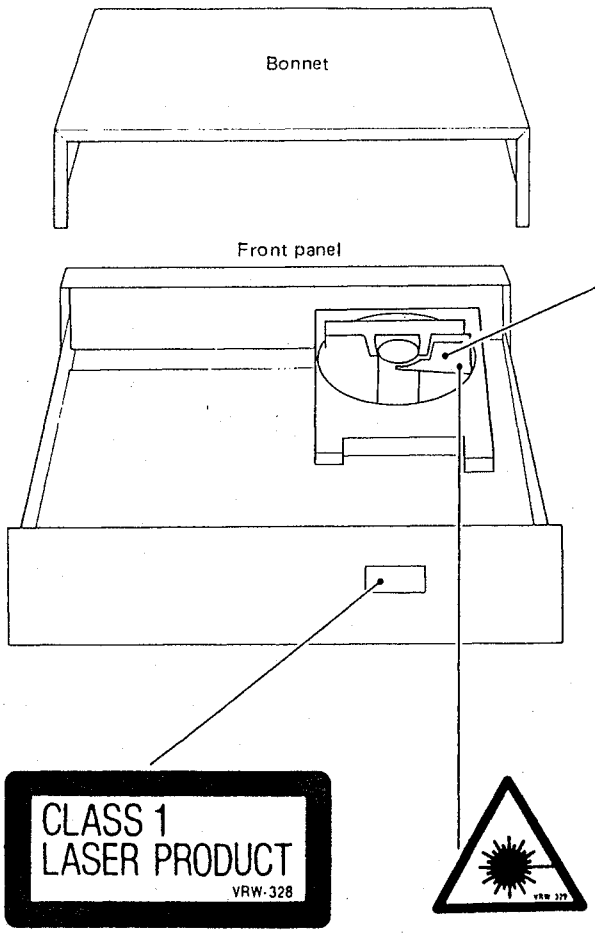
LASER
Picture 1
Warning sign for laser radiation

ADVERSEL:
USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION UNDGÅ UDSAETTELSE FOR STRÅLING.

IMPORTANT
THIS PIONEER APPARATUS CONTAINS LASER OF HIGHER CLASS THAN 1. SERVICING OPERATION OF THE APPARATUS SHOULD BE DONE BY A SPECIALLY INSTRUCTED PERSON.

VIKTIGT
APARATEN INNEHÅLLER LASER AV HÖGRE KLASS ÄN 1. INGREPP I APPARATEN BÖR GÖRAS AV SPECIELLT UTBILDAD PERSONAL.

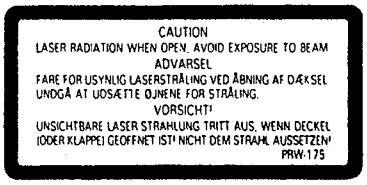
LABEL CHECK



HEM and HB models

HB model

HEM model


CAUTION
LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO BEAM
ADVARSEL
FARE FOR USYNLIG LASERSTRÅLING VED ÅBNING AF DÆKSEL
UNDGÅ AT UDSÆTTE ØJNENE FOR STRÅLING.
VORSICHT!
UNSICHTBARE LASER STRAHLUNG TRITT AUS, WENN DECKEL
ODER KLAPPE GEÖFFNET IST! NICHT DEM STRAHL AUSSETZEN!
PRW-175

Additional Laser Caution

1. Laser Interlock Mechanism
   The ON/OFF status of the clamp switch (S102) for detecting loading completion is detected by the system microprocessor, and the design prevents laser diode oscillation when the clamp switch is OFF.
   Thus, the interlock will no longer function if the clamp switch (S102) is deliverately shorted.
   In the test mode the interlock mechanism will not function (refer to page 30).
   Laser diode oscillation will continue if pin 4, 5, or 29 of CXA1081S (ICI) is connected to ground or the terminals of Q1 are shorted to each other (fault condition).
2. If the fault condition described in 1 is induced with the cover removed and the objective lens extending past the outer circumference of the disc clamper diameter, close viewing of the objective lens with the naked eye will cause exposure to a Class 1 or higher laser beam.

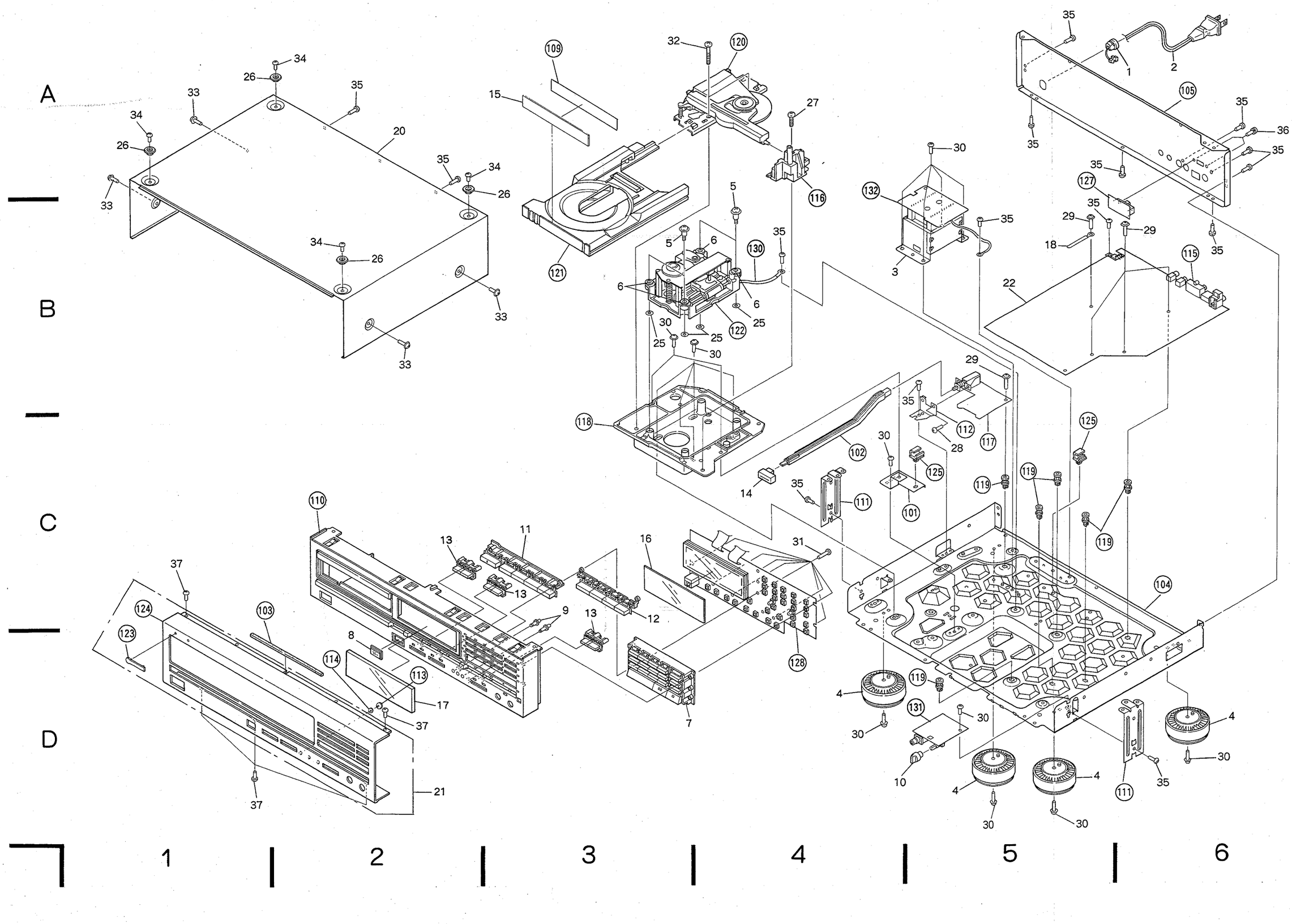
2. EXPLODED VIEWS AND PARTS LIST

NOTES :
- Parts without part number cannot be supplied.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

2.1 EXTERIOR

Parts List

Mark	No.	Part No.	Description
⚠	1	CM-22C	Strain relief
⚠	2	PDG1015	AC power cord
⚠	3	PTT1109	Power transformer (AC120V)
	4	AMR1159	Leg assembly
	5	PBA1027	Floating screw
	6	PEB1031	Floating rubber
	7	PAD1049	Play button assembly
	8	PNW1075	Sensor window
	9	PAA1004	Gold Button
	10	PAC1370	Headphone knob
	11	PAC1374	O/C Button
	12	PAC1375	Track Button
	13	PAC1373	Select button
	14	PAC1372	Power Button
	15	PNW1525	Tray name plate
	16	PAM1323	Display screen
	17	PAM1291	Window
	18	RNH-184	Cord holder
	19		• • • • •
	20	PYY1071	Bonnet
	21	PEA1002	Front panel assembly
◉	22	PWZ1641	Main board assembly
	23		• • • • •
	24		• • • • •
	25	WA32F070M080	Washer
	26	ABE1009	Washer
	27	IBZ30P100FCC	Screw
	28	PMZ30P060FCU	Screw
	29	IBZ30P150FCU	Screw
	30	IBZ30P080FCC	Screw
	31	PPZ30P200FCU	Screw
	32	BPZ30P250FMC	Screw
	33	FBT40P080FZK	Screw
	34	BBZ40P080FZK	Screw
	35	BBZ30P080FCC	Screw
	36	PMA26P040FCU	Screw
	37	BBT30P080FCU	Screw
	101		Mechanism angle
	102		SW joint
	103		Spacer
	104		Under base
	105		Rear base
	106		• • • • •
	107		• • • • •
	108		• • • • •
	109		Tape
	110		Function panel
	111		Side angle
	112		Switch angle
	113		Lens
	114		Washer
	115		Shield cover
	116		Slide guide
	117		Switch board unit
	118		Mechanism base
	119		PCB spacer
	120		Loading base assembly
	121		Tray assembly
	122		Servo mechanism assembly
	123		Name plate
	124		Front panel
	125		P Plate holder
	126		• • • • •
	127		D-OUT SW board assembly
	128		Function board assembly
	129		• • • • •
	130		Lead wire unit
	131		Headphone board assembly
	132		Transformer board assembly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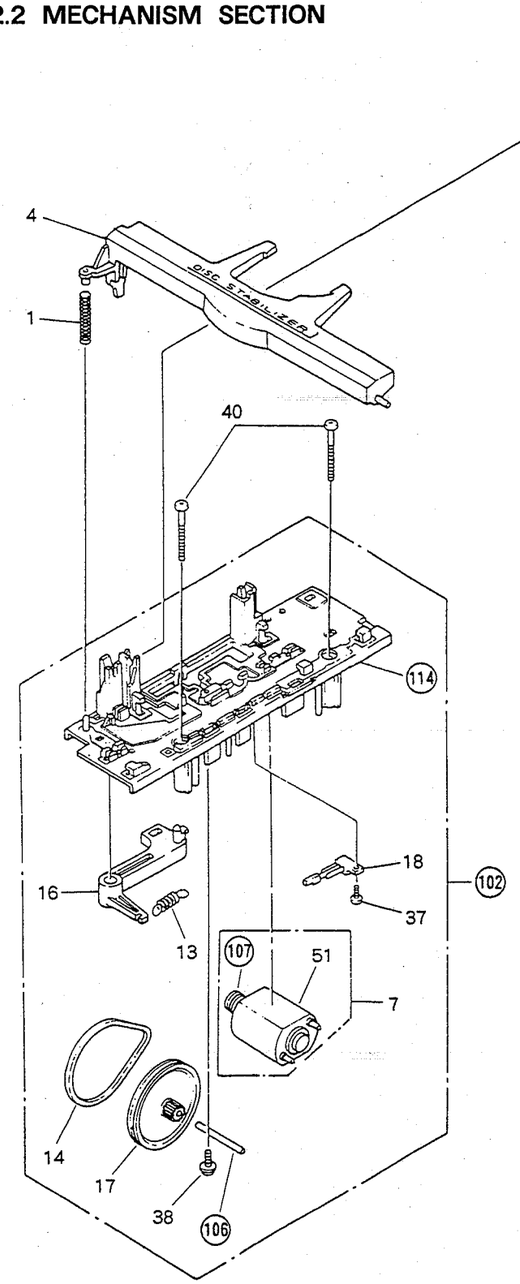
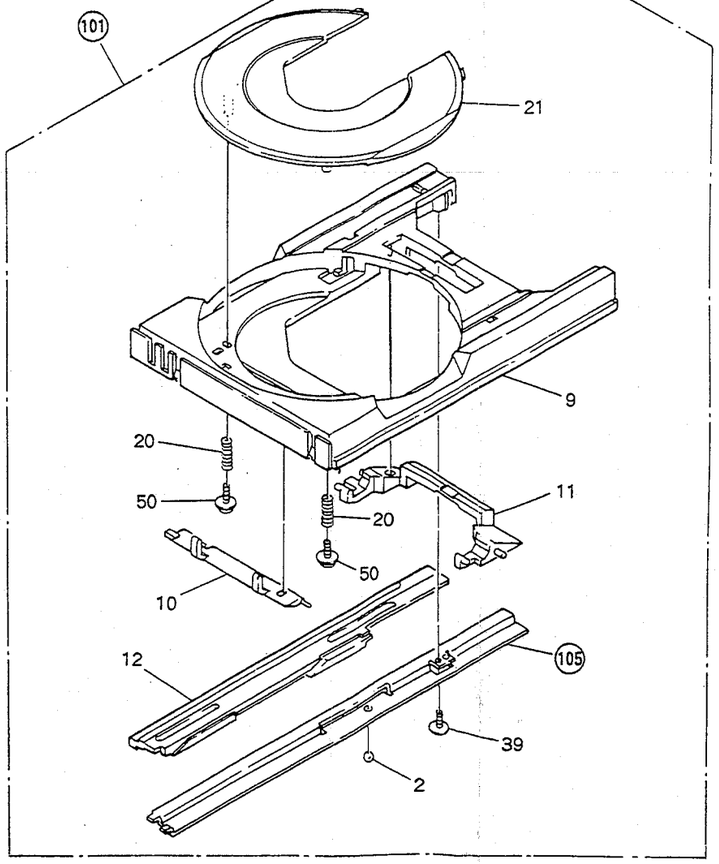
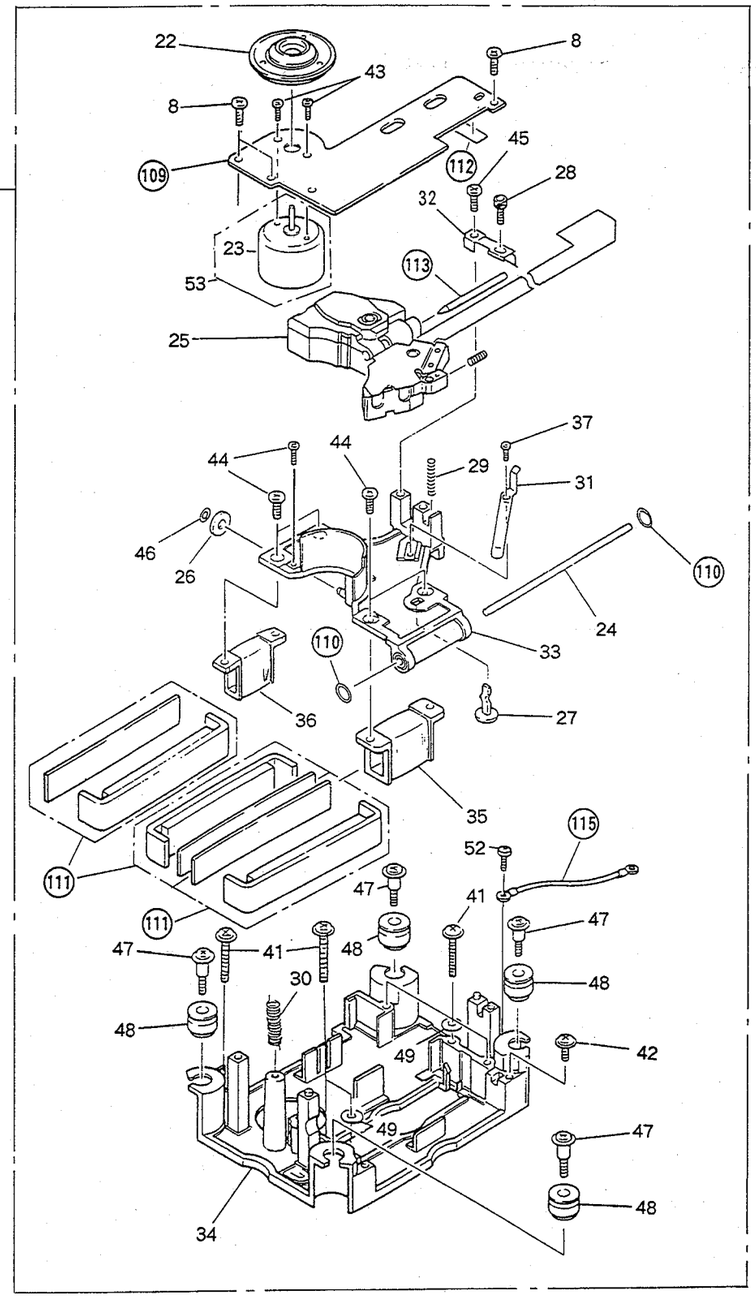
2.2 MECHANISM SECTION







Parts List of Mechanism Section

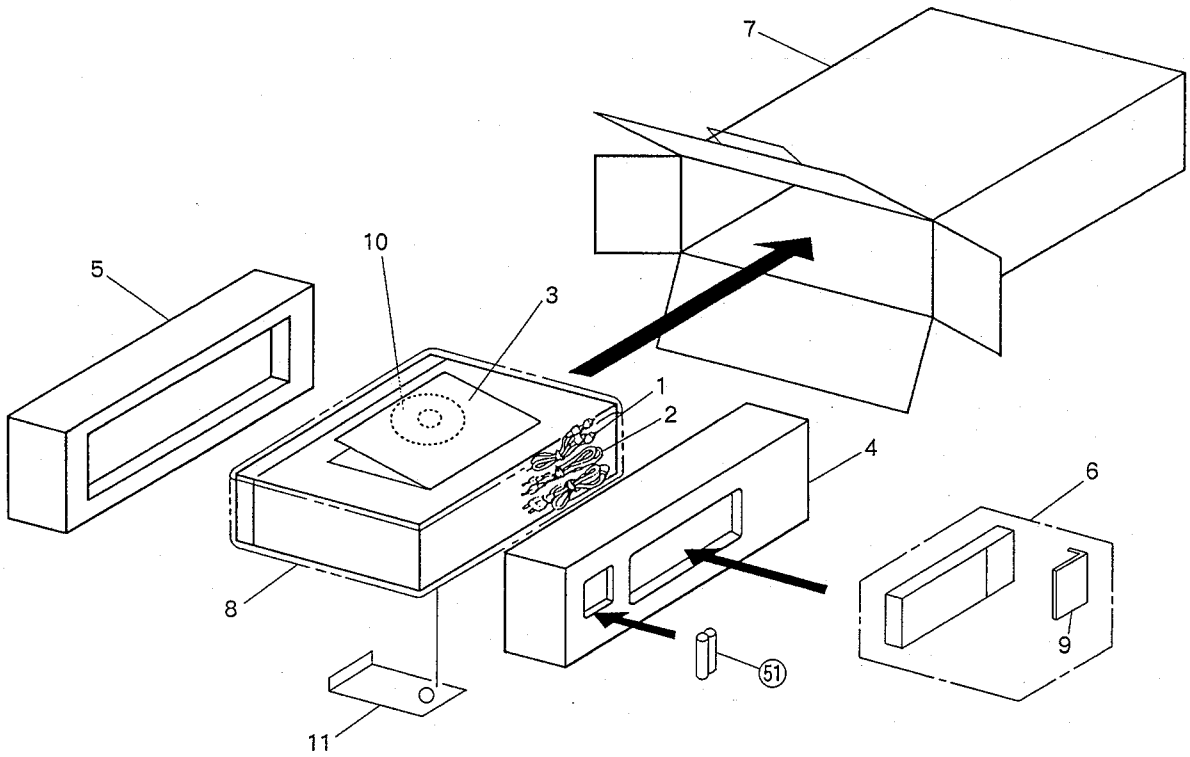
Mark	No.	Part No.	Description
	1	PBH1013	Spring
	2	PBP-001	Steel ball ϕ 4
	3	PNW1084	Clamp holder
	4	PNW1085	Clmap retainer
	5	PNM1010	Disc cushion
	6	PYY1084	Clamper assembly
	7	PYY1090	Motor assembly (LOADING)
	8	PBA1031	Screw (2 × 8)
	9	PNW1390	Tray
	10	PNW1330	Plate lever (F)
	11	PNW1331	Plate lever (R)
	12	PNW1332	Rack
	13	PBH1012	Clamper spring
	14	PEB1013	Belt
	15		• • • • •
	16	PNW1083	Clamper lever
	17	PNW1171	Gear pulley
	18	VSK-015	Leaf switch (CLAMP : S102)
	19	PEB1032	Stopper rubber
	20	PBH1045	Plate spring
	21	PNW1521	Disc plate
	22	PNW1064	Disc table
	23	PXM1009	Spindle motor
	24	PLA1061	Guide bar
	25	PWY1011	Pickup assembly
	26	PNW1408	Roller
	27	PNW1407	Adjustment shaft
	28	PBA1026	Adjustment screw
	29	PBH1029	Shaft spring
	30	PBH1068	Earth spring
	31	PBK1045	Plate spring T
	32	PBK1046	Plate spring R
	33	PNW1405	Carriage
	34	PNW1406	Mechanism chassis
	35	PXP1001	Drive unit
	36	PXP1002	Detector unit
	37	BPZ20P080FZK	Screw
	38	IPZ30P060FMC	Screw
	39	PPZ30P080FMC	Screw
	40	BBZ30P250FMC	Screw
	41	IBZ30P180FMC	Screw
	42	IPZ30P080FMC	Screw
	43	PMZ20P030FMC	Screw
	44	PMZ26P040FMC	Screw
	45	PPZ26P080FMC	Screw
	46	WT25D047D025	Washer
	47	PBA1027	Floating screw
	48	PEB1031	Floating rubber
	49	WA32F100M050	Washer
	50	PBA1025	Screw
	51	PXM1002	Motor (LOADING)
	52	BBZ30P050FZK	Screw
	53	PYY1110	Motor assembly (Spindle with oil)

Mark	No.	Part No.	Description
	101		Tray assembly
	102		Loading base assembly
	103		Magnet
	104		Clamper
	105		Slide base
	106		Gear shaft
	107		Motor pulley
	108		Servo mechanism assembly
	109		Base plate
	110		Rubber ring
	111		Yoke unit
	112		Felt
	113		PU guide bar
	114		Loading base
	115		Earth lead unit

3. PACKING

Parts List of Packing

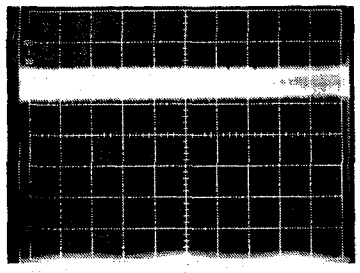
Mark	No.	Part No.	Description
	1	PDE-319	Connection cord with mini plug
	2	PDE1002	Connection cord with pin plug
	3	PRB1103	Operating instructions (English)
	4	PHA1069	Protector (R)
	5	PHA1068	Protector (F)
	6	PWW1038	Remote control unit
	7	PHG1352	CD packing case
	8	Z23-007	Mirror mat sheet
	9	PZN1001	Battery cover
	10	PHC1030	Spacer (into the tray)
	11	PRM1016	Caution card
	51		Battery



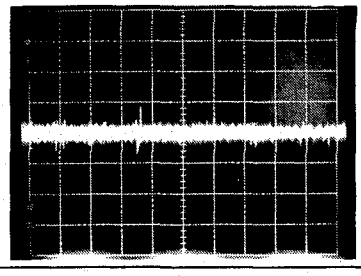
WAVE FORMS

NOTE : The encircled numbers denote measuring points in the schematic diagram.

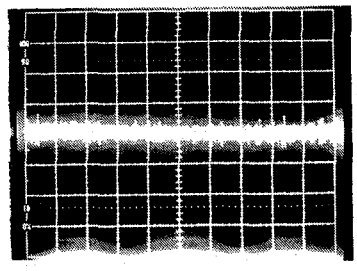
① CN1-5 Pin : PLAY MODE
50mV/div 5msec/div



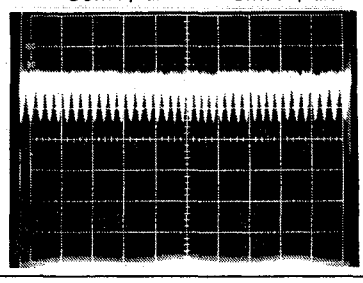
③ TP1-6 Pin : SEARCH MODE
500mV/div 10msec/div



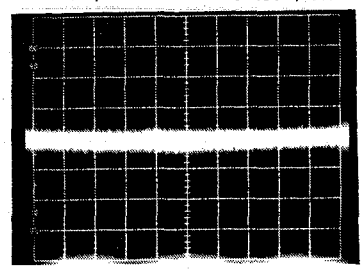
⑥ IC5-9 Pin : PLAY MODE
2V/div 10msec/div



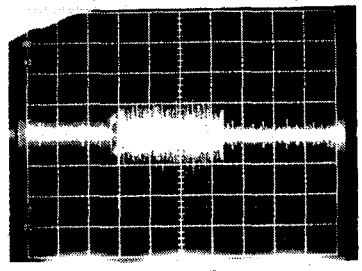
① CN1-5 Pin : SEARCH MODE
50mV/div 5msec/div



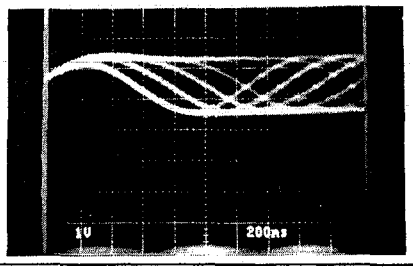
④ TP1-2 Pin : PLAY MODE
1V/div 10msec/div



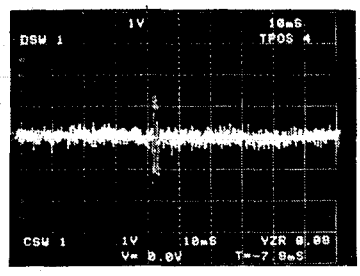
⑥ IC5-9 Pin : SEARCH MODE
2V/div 10msec/div



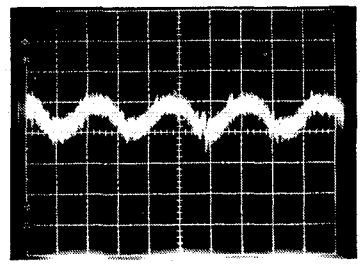
② TP1-1 Pin : PLAY MODE
1V/div 200nsec/div



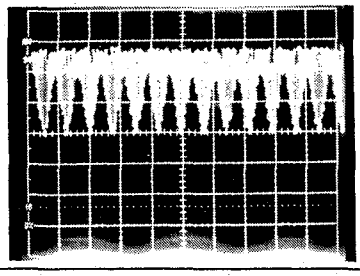
④ TP1-2 Pin : SEARCH MODE
1V/div 10msec/div



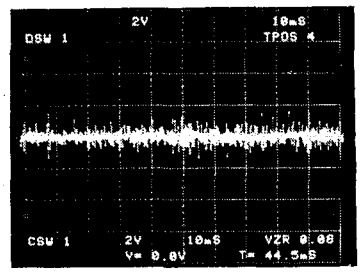
⑦ Q2 Emitter : PLAY MODE
2V/div 50msec/div



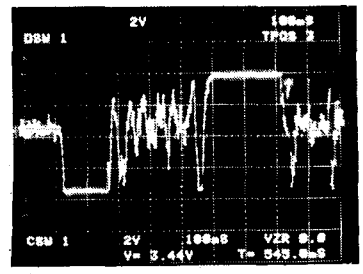
② TP1-1 Pin : SEARCH MODE
500mV/div 100μsec/div



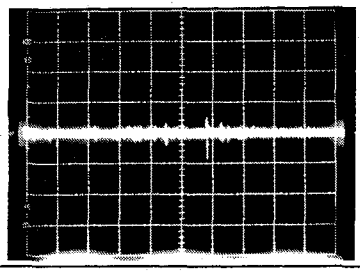
⑤ Q22 Emitter PLAY MODE
2V/div 10msec/div



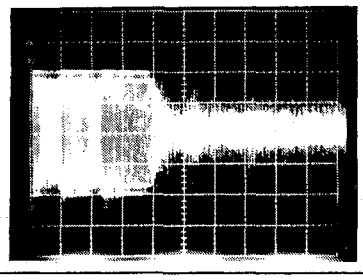
⑦ Q2 Emitter : SEARCH MODE
2V/div 100msec/div



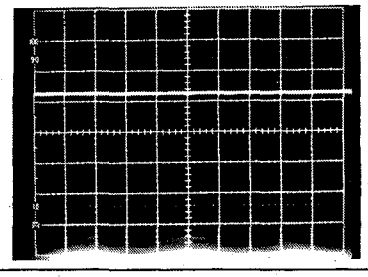
③ TP1-6 Pin : PLAY MODE
500mV/div 10msec/div



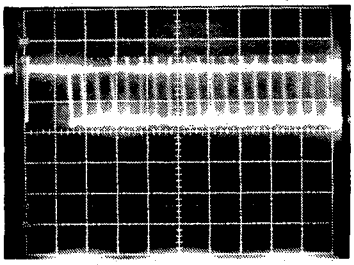
⑤ Q22 Emitter SEARCH MODE
2V/div 10msec/div



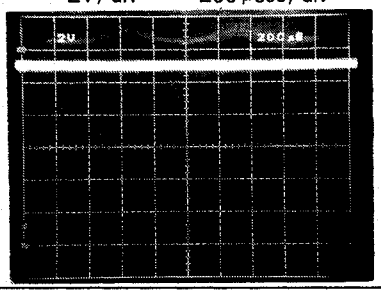
⑧ IC2-33, 34 Pin : PLAY MODE
2V/div 10msec/div



⑨ IC1-27 Pin : PLAY MODE
2V/div 500nsec/div

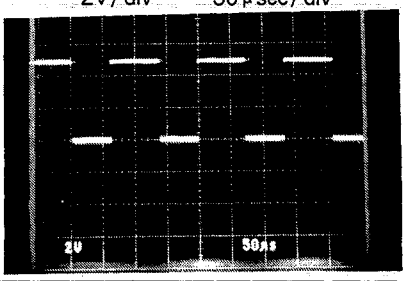


⑫ TP2-1 Pin : PLAY MODE
2V/div 200μsec/div

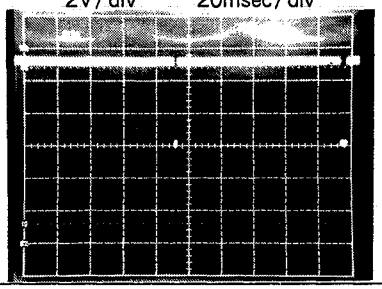


⑯ IC3-76 Pin : STOP MODE
2V/div 200nsec/div

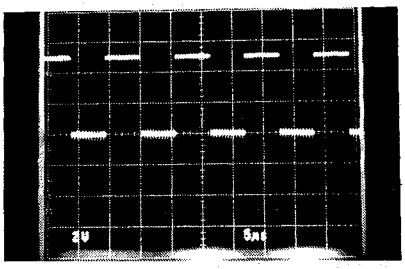
⑩ IC3-4 Pin : PLAY MODE
2V/div 50μsec/div



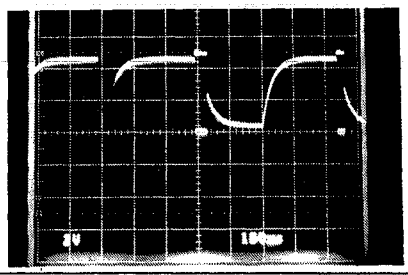
⑫ TP2-1 Pin : SEARCH MODE
2V/div 20msec/div



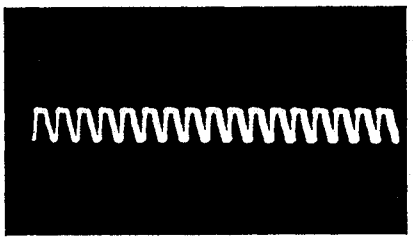
⑰ IC3-79 Pin : STOP MODE
2V/div 5μsec/div



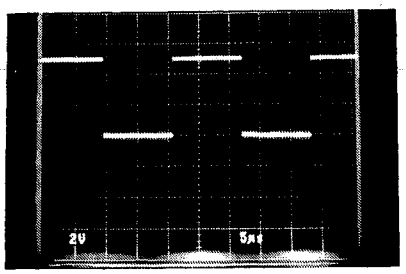
⑩ IC3-4 Pin : SEARCH MODE
2V/div 100msec/div



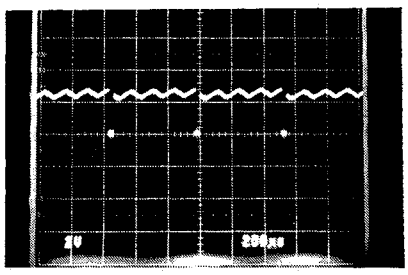
⑬ IC2-38 Pin : PLAY MODE
2V/div 200nsec/div



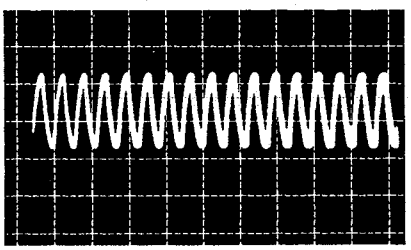
⑱ IC3-80 Pin : STOP MODE
2V/div 5μsec/div



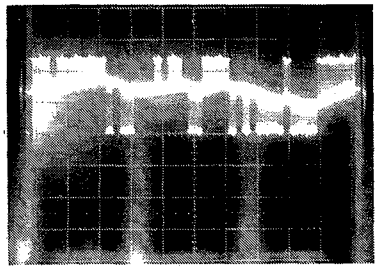
⑪ IC3-3 Pin : PLAY MODE
2V/div 200μsec/div



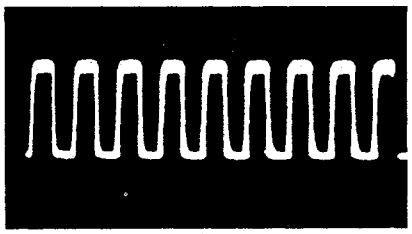
⑭ IC3-8 Pin : PLAY MODE
2V/div 200nsec/div



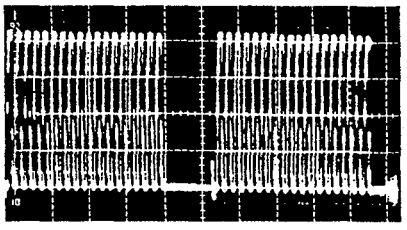
⑪ IC3-3 Pin : SEARCH MODE
2V/div 10msec/div



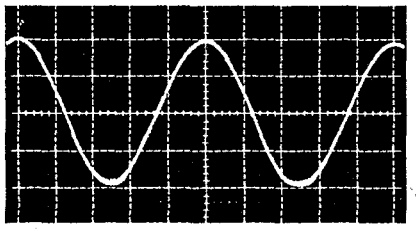
⑮ TP2-2 Pin : PLAY MODE
2V/div 200nsec/div



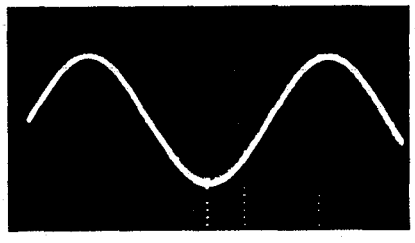
⑲ IC15-16 Pin : STOP MODE
1V/div 0.5μsec/div



⑳ IC22-1 Pin : PLAY MODE
5V/div 20μsec/div

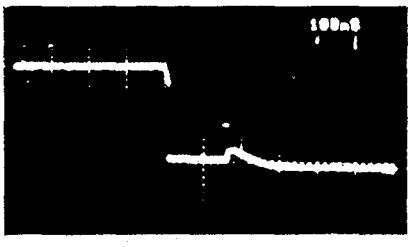


㉑ OUTPUT L ch : PLAY MODE
2V/div 50μsec/div

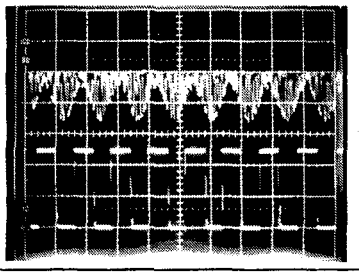


㉒ IC8-5 Pin : POWER ON
2V/div 100msec/div

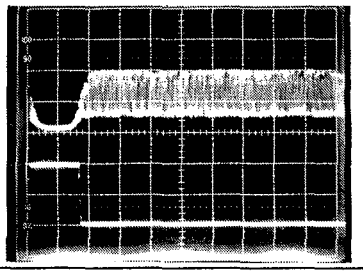
㉒ IC8-5 Pin : POWER OFF
2V/div 100msec/div



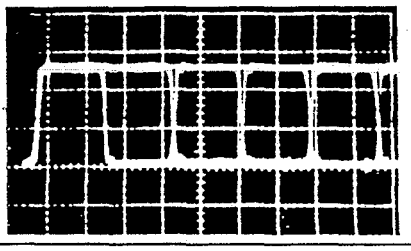
㉓ IC1-22 Pin : TRACKING OPEN
Upper TP1-1, 1V/div 0.1msec/div
Lower IC1-22, 2V/div



㉔ IC1-21 Pin : DFCT
Upper TP1-1, 1V/div 0.5msec/div
Lower IC1-21, 5V/div



㉕ IC3-27 Pin : DOTX
2V/div 50nsec/div



4. SCHEMATIC DIAGRAM

1. RESISTORS :
Indicated in Ω, 1/4W, 1/6W and 1/8W, ±5% tolerance unless otherwise noted k ; kΩ, M ; MΩ, (F) ; ±1%, (G) ; ±2%, (K) ; ±10%, (M) ; ±20% tolerance.

2. CAPACITORS :
Indicated in capacity (μF) / voltage (V) unless otherwise noted p ; pF. Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT :
⎡ ⎤ ; DC voltage (V) at play state.
⇦mA ; DC current at play state.
Value in ( ) is DC current at stop state.

4. OTHERS :
➡ ; Signal route.
⊘ ; Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

5. SWITCHES : (The underlined indicates the switch position)

MAIN BOARD ASSEMBLY
S1 : TEST MODE

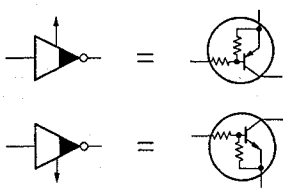
FUNCTION BOARD ASSEMBLY
S201 : 1
S202 : 2
S203 : 3
S204 : 4
S205 : 5
S206 : 6 TRACK No. KEY
S207 : 7
S208 : 8
S209 : 9
S210 : 10
S211 : +10
S212 : ≧20
S213 : ▶▶|] TRACK SEARCH
S214 : |◀◀]
S215 : →] INDEX SEARCH
S216 : ←]
S217 : ▶▶] MANUAL SEARCH
S218 : ◀◀]
S219 : PROGRAM
S220 : CHECK
S221 : CLEAR
S222 : TIME
S223 : REPEAT
S224 : AUTO SPACE
S225 : AUTO PGM EDIT
S226 : TIME FADE EDIT
S227 : ↗] AUTO FADER
S228 : ↘]
S229 : MUSIC WINDOW
S230 : RANDOM PLAY
S231 : DISPLAY OFF
S233 : PAUSE (❚❚)
S234 : PLAY (▷)
S235 : OPEN/CLOSE (⏏)
S236 : STOP (■)

D-OUT SW BOARD ASSEMBLY
S601 : DIGITAL OUT ON — OFF

SW BOARD UNIT
S501 : POWER ON — OFF

OUTSIDE OF P. C. BOARDS ASSEMBLY
S102 : CLAMP CLAMP — OPEN

SIMBOLS OF DIGITAL TRANSISTOR



(PWZ1676 : HEM,HB,SD TYPES)
(PWZ1641 : KU/CA TYPE)
MAIN BOARD ASSEMBLY

PXP1001 DRIVER
PXP1002 FEED BACK
PWY1011 PICK-UP ASSEMBLY
PYY1110 SPINDLE MOTOR ASSEMBLY
PYY1090 LOADING MOTOR ASSEMBLY
S102 VSK-015 CLAMP SW
/CLAMP
/OPEN

IC1 IC1 : RF AMP
Q1 : LD POWER
Q2,Q3 : SPINDLE MOTOR DRIVER
Q22,Q23 : FOCUS DRIVER
Q8,Q9 : PLL FILTER
IC5 (2/2) : TRACKING DRIVER
IC5 (1/2) : CARRIAGE DRIVER
IC2 : SERVO CONTROL
IC3 : DECODER
IC4 : SYSTEM CONTROL
Q24-Q28 : LOADING MOTOR DRIVER
IC8 : SYSTEM RESET
IC6 : DIGITAL ATT
IC7 : 16K S-RAM
IC30 - IC32 : PROTECTER
D-OUT SW BOARD ASSEMBLY

SHORT CIRCUIT WHEN ADJUSTING VCO

IC1 Pin No.	Volts
1	0
2	1.3
3	0
4	2.4
5	2.8
6	4.8
7	0
8	0
9	0
10	0
11	0
12	1.2
13	0.1
14	0
15	3.1
16	3.0
17	5.0
18	0
19	0
20	0
21	4.9
22	0
23	1.0
24	2.1
25	0
26	2.5
27	2.4
28	5.0
29	0
30	5.0

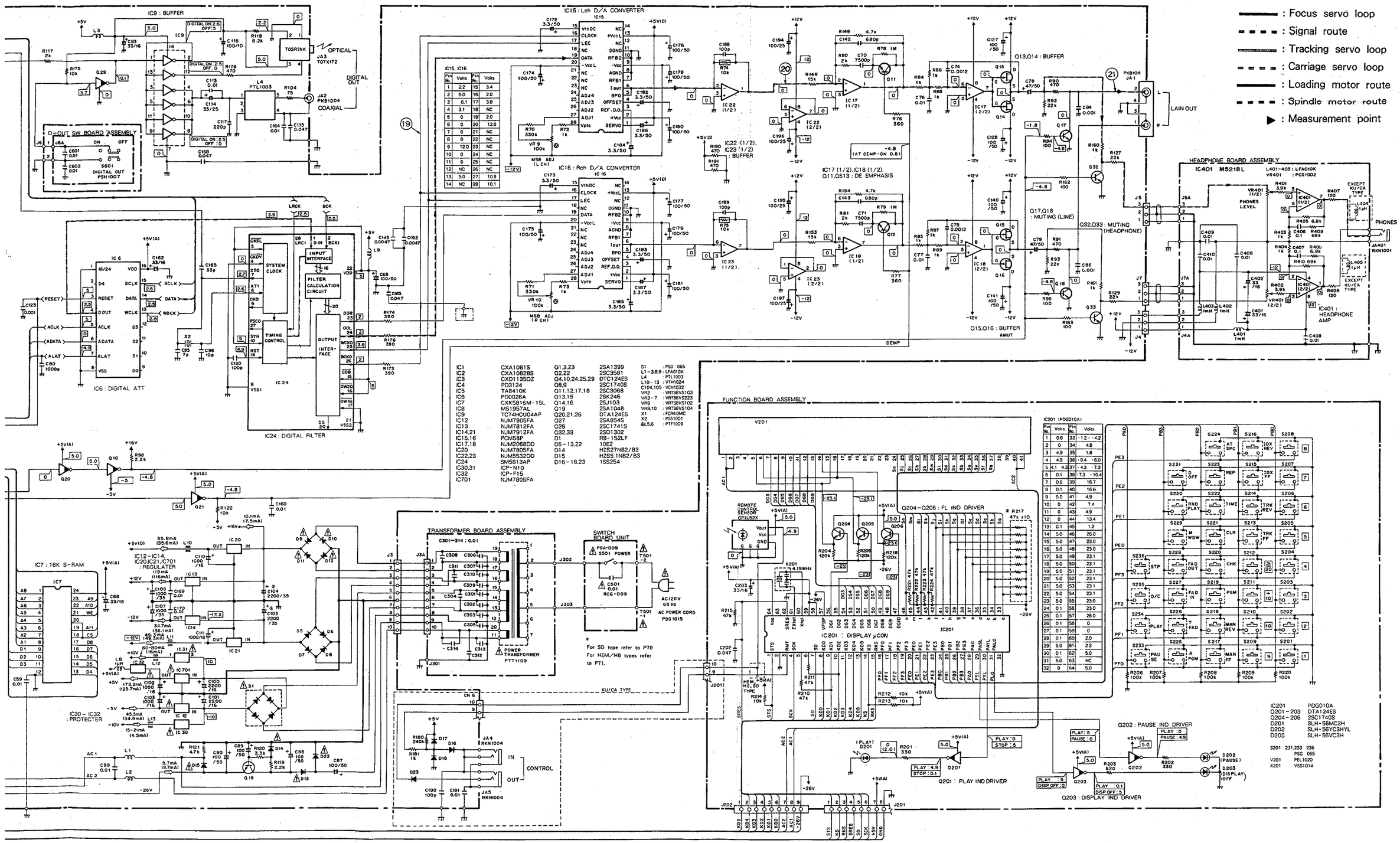
IC2 (CXA1082BS) Pin No.	Volts	Pin No.	Volts
1	5.0	25	5.0
2	0	26	0
3	0	27	5.0
4	0	28	5.0
5	0	29	4.9
6	0	30	5.0
7	0	31	5.0
8	0	32	0
9	0	33	2.5
10	0	34	2.5
11	0.4	35	2.3
12	0	36	2.3
13	0.2	37	3.5
14	0	38	2.4
15	0	39	5.0
16	5.0	40	2.5
17	0	41	5.0
18	0	42	2.5
19	0	43	5.0
20	0	44	0
21	0	45	0.8 1.5
22	0	46	2.5
23	4.1	47	5.0
24	5.0	48	0

IC5 Pin No.	Volts
1	0.5 0.8
2	0.5 0.8
3	0
4	0
5	10.0
6	0
7	0
8	0
9	0
10	10.0

IC3 (CXD1135Q2) Pin No.	Volts	Pin No.	Volts
1	2.5	41	2.5
2	5.0	42	2.5
3	2.5	43	2.5
4	2.8	44	2.5
5	2.4	45	2.5
6	2.5	46	2.0 2.9
7	5.0	47	2.0 2.9
8	2.4	48	1.3 3.6
9	2.4	49	4.4
10	0	50	2.5
11	1.8	51	2.3
12	0	52	0
13	5.0	53	2.2
14	5.0	54	2.2
15	5.0	55	0
16	5.0	56	0
17	0	57	5.0
18	5.0	58	0
19	0	59	0
20	5.0	60	1.3
21	0	61	1.3
22	0	62	0
23	0	63	0
24	0	64	0
25	5.0	65	0
26	5.0	66	0
27	2.5	67	0
28	5.0	68	2.5
29	1.9	69	2.5
30	1.9	70	2.3
31	1.9	71	5.0
32	1.9	72	0
33	5.0	73	5.0
34	1.9	74	0
35	1.9	75	2.4
36	1.9	76	2.3
37	1.9	77	2.3
38	2.5	78	2.5
39	2.5	79	2.5
40	2.5	80	2.5

IC4 (PD3124) Pin No.	Volts	Pin No.	Volts
1	0	34	5.0
2	2.0	35	0
3	2.0	36	5.0
4	5.0	37	0
5	5.0	38	0
6	5.0	39	0
7	5.0	40	0
8	0.1	41	0.6
9	5.0	42	0
10	5.0	43	NC
11	4.8	44	NC
12	2.6 3.5	45	NC
13	5.0	46	NC
14	5.0	47	NC
15	0	48	4.9
16	5.0	49	0.1 0.6
17	0	50	5.0
18	5.0 -0.6		(DEMP. ON)
19	5.0	51	5.0
20	5.0	52	5.0
21	0	53	0
22	5.0	54	0
23	NC	55	0
24	NC	56	0
25	NC	57	0
26	NC	58	0
27	NC	59	NC
28	NC	60	NC
29	NC	61	NC
30	5.0	62	NC
31	0	63	NC
32	NC	64	NC
33	5.0		

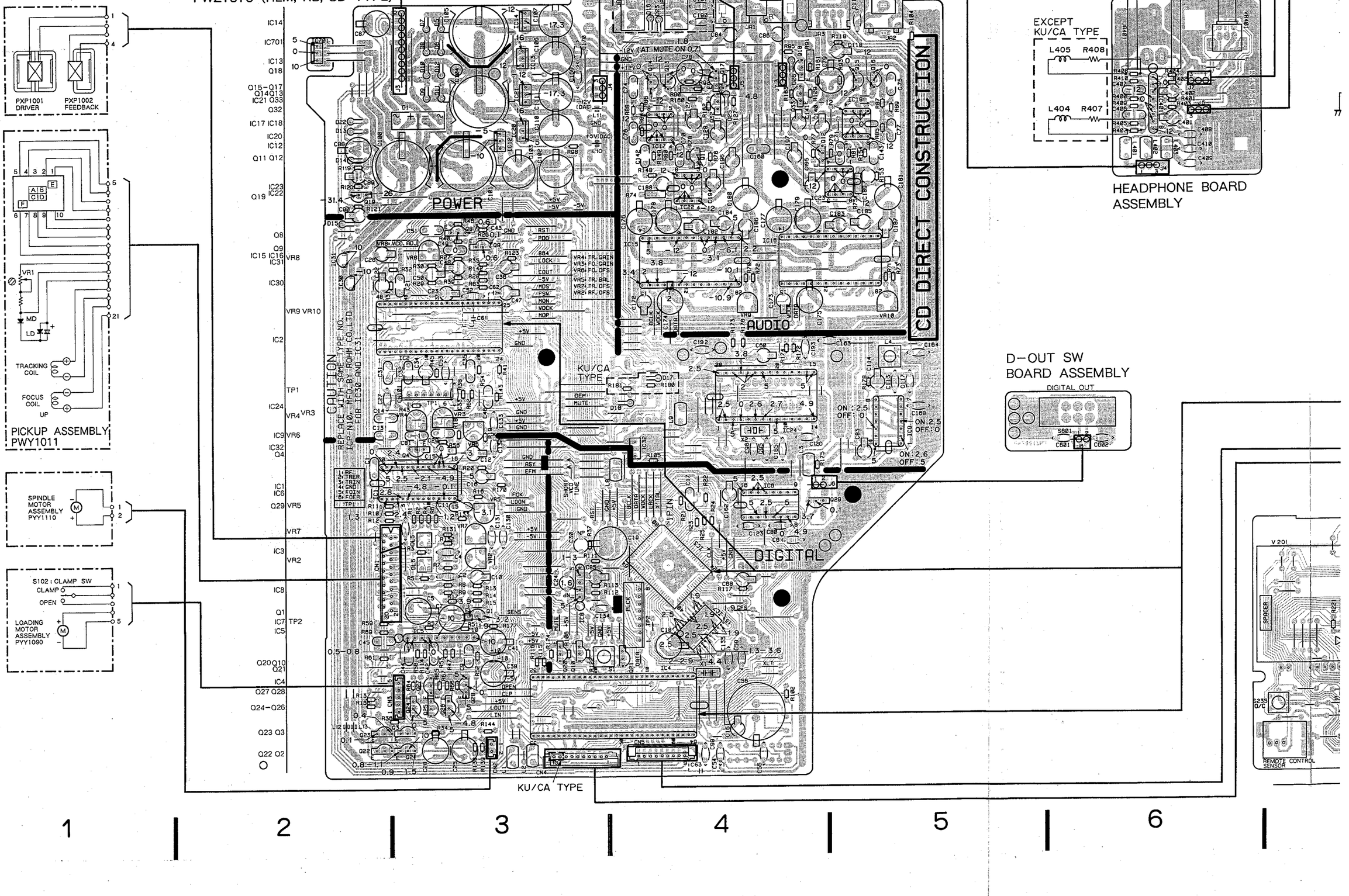
IC7 Pin No.	Volts
1	2.5
2	2.5
3	2.5
4	2.5
5	2.5
6	2.5
7	2.5
8	2.5
9	1.9
10	1.9
11	1.9
12	0
13	1.9
14	1.9
15	1.9
16	1.9
17	1.9
18	2.5
19	1.3 3.6
20	2.5
21	4.4
22	2.0 2.9
23	2.0 2.9
24	5.0



PION-02593/DRUCK4

5. P. C. BOARDS CONNECTION DIAGRAM

MAIN BOARD ASSEMBLY
PWZ1641 (KU/CA TYPE)
PWZ1676 (HEM, HB, SD TYPE)



7 8 9 10 11 12

A

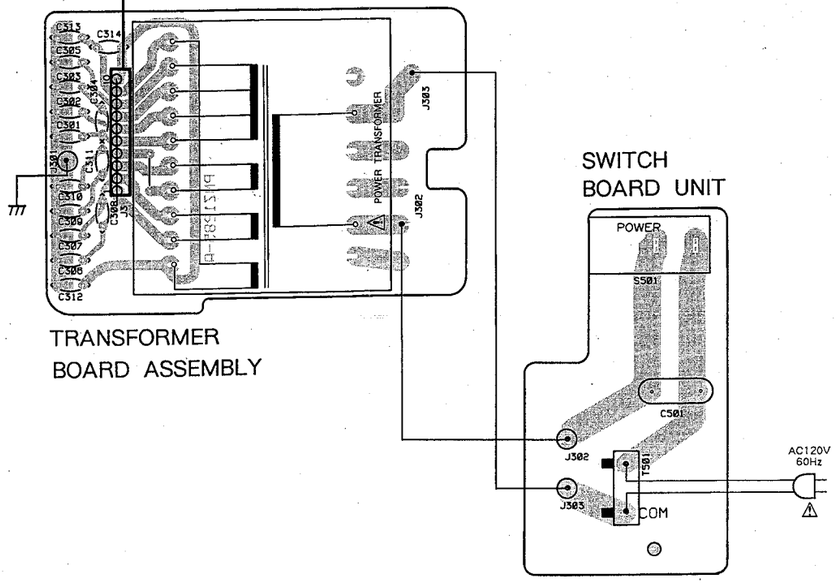
B

C

D

BOARD

TRANSFORMER BOARD ASSEMBLY



SWITCH BOARD UNIT

IC2 (CXA1082BS)

Pin No.	Volts	Pin No.	Volts
1	– 5.0	25	– 5.0
2	0	26	0
3	0	27	5.0
4	0	28	5.0
5	0	29	4.9
6	0	30	5.0
7	0	31	5.0
8	0	32	0
9	0	33	2.5
10	0	34	2.5
11	0.4	35	2.3
12	0	36	2.3
13	0.2	37	3.5
14	0	38	2.4
15	0	39	5.0
16	5.0	40	2.5
17	0	41	5.0
18	0	42	2.5
19	0	43	5.0
20	0	44	0
21	0	45	0.8 – 1.5
22	0	46	2.5
23	– 4.1	47	5.0
24	5.0	48	0

IC3 (CXD1135QZ)

Pin No.	Volts	Pin No.	Volts
1	2.5	41	2.5
2	5.0	42	2.5
3	2.5	43	2.5
4	2.8	44	2.5
5	2.4	45	2.5
6	2.5	46	2.0 – 2.9
7	5.0	47	2.0 – 2.9
8	2.4	48	1.3 – 3.6
9	2.4	49	4.4
10	0	50	2.5
11	1.8	51	2.3
12	0	52	0
13	5.0	53	2.2
14	5.0	54	2.2
15	5.0	55	0
16	5.0	56	0
17	0	57	5.0
18	5.0	58	0
19	0	59	0
20	5.0	60	1.3
21	0	61	1.3
22	0	62	0
23	0	63	0
24	0	54	0
25	5.0	65	0
26	5.0	66	0
27	2.5	67	0
28	5.0	68	2.5
29	1.9	69	2.5
30	1.9	70	2.3
31	1.9	71	5.0
32	1.9	72	0
33	5.0	73	5.0
34	1.9	74	0
35	1.9	75	2.4
36	1.9	76	2.3
37	1.9	77	2.3
38	2.5	78	2.5
39	2.5	79	2.5
40	2.5	80	2.5

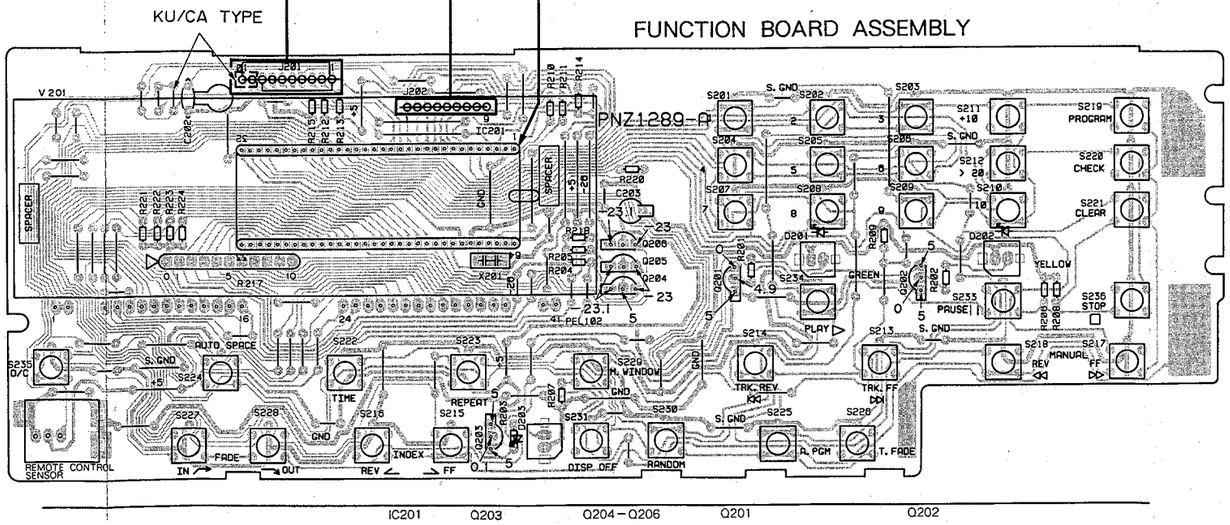
IC4 (PD3124)

Pin No.	Volts	Pin No.	Volts
1	0	34	5.0
2	2.0	35	0
3	2.0	36	5.0
4	5.0	37	0
5	5.0	38	0
6	5.0	39	0
7	5.0	40	0
8	0.1	41	0.6
9	5.0	42	0
10	5.0	43	NC
11	4.8	44	NC
12	2.6 – 3.5	45	NC
13	5.0	46	NC
14	5.0	47	NC
15	0	48	4.9
16	5.0	49	0.1 – 0.6
17	0	50	5.0
18	5.0 → 0 (DEMP. ON)		
19	5.0	51	5.0
20	5.0	52	5.0
21	0	53	0
22	5.0	54	0
23	NC	55	0
24	NC	56	0
25	NC	57	0
26	NC	58	0
27	NC	59	NC
28	NC	60	NC
29	NC	61	NC
30	5.0	62	NC
31	0	63	NC
32	NC	64	NC
33	5.0		

IC201 (PDG010A)

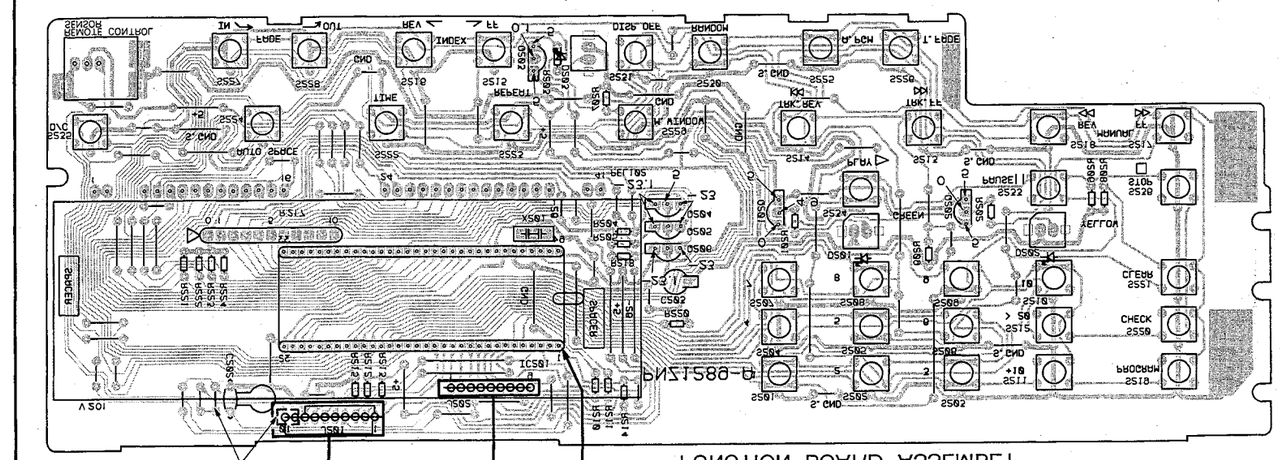
Pin No.	Volts	Pin No.	Volts
1	0.6	33	- 1.2 – - 4.2
2	0	34	4.8
3	4.9	35	1.8
4	4.9	36	- 0.4 – - 6.0
5	4.1 – 4.3	37	- 4.3 – - 7.3
6	0.1	38	- 7.3 – - 10.4
7	0.6	39	– 16.7
8	0.1	40	– 16.6
9	5.0	41	4.9
10	0	42	– 7.4
11	0	43	4.9
12	0	44	– 13.4
13	0.1	45	– 1.2
14	5.0	46	– 26.0
15	5.0	47	– 23.0
16	5.0	48	– 23.0
17	5.0	49	– 23.1
18	5.0	50	– 23.1
19	5.0	51	– 23.1
20	5.0	52	– 23.1
21	5.0	53	– 23.1
22	5.0	54	– 23.1
23	5.0	55	– 23.0
24	0.1	56	– 23.0
25	0.1	57	– 26.0
26	0.1	58	0
27	0.1	59	0
28	0.1	60	2.0
29	5.0	61	2.2
30	0.1	62	5.0
31	5.0	63	NC
32	0	64	5.0

FUNCTION BOARD ASSEMBLY



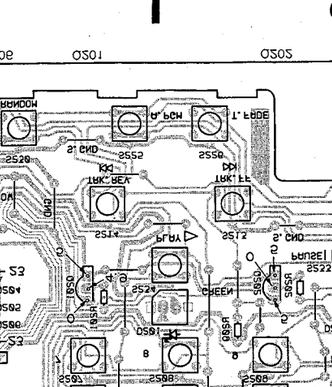
This P. C. B. connection diagram is viewed from the foil side.

FUNCTION BOARD ASSEMBLY

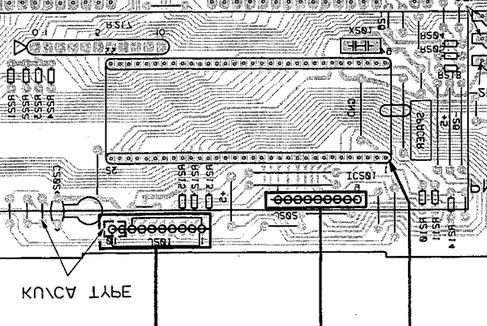


KULCA TYPE

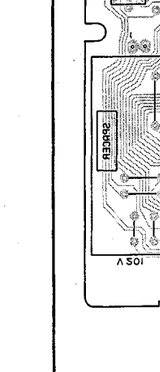
BOARD UNIT
SWITCH



BOARD ASSEMBLY
TRANSFORMER



GR



IC5 (CXA1085BS)

No.	Pin	Volts
1	0.2 –	0
2	0	2.5
3	0	2.5
4	0	2.5
5	0	2.5
6	0	2.5
7	0	2.5
8	0	0
9	0	0.2
10	0	2.5
11	0.0	2.5
12	0	2.5
13	0	2.6
14	0	5.5
15	0	2.5
16	0	0.2
17	0	0.2
18	0	2.5
19	0	0.2
20	0	0.2
21	0	0.2
22	0	0.2
23	0	0.2
24	0	0.2

IC3 (CXD1132Q)

No.	Pin	Volts
1	2.5	2.5
2	2.5	2.5
3	2.5	2.5
4	2.5	2.5
5	2.5	2.5
6	2.5	2.5
7	0.2	2.5
8	2.5	2.5
9	0.2	2.5
10	0	2.5
11	8.1	2.5
12	2.5	2.5
13	2.5	5.5
14	0.2	2.5
15	0	2.5
16	0.2	2.5
17	0	2.5
18	0	2.5
19	0	2.5
20	0	2.5
21	0	2.5
22	0	2.5
23	0	2.5
24	0	2.5

IC4 (bD3154)

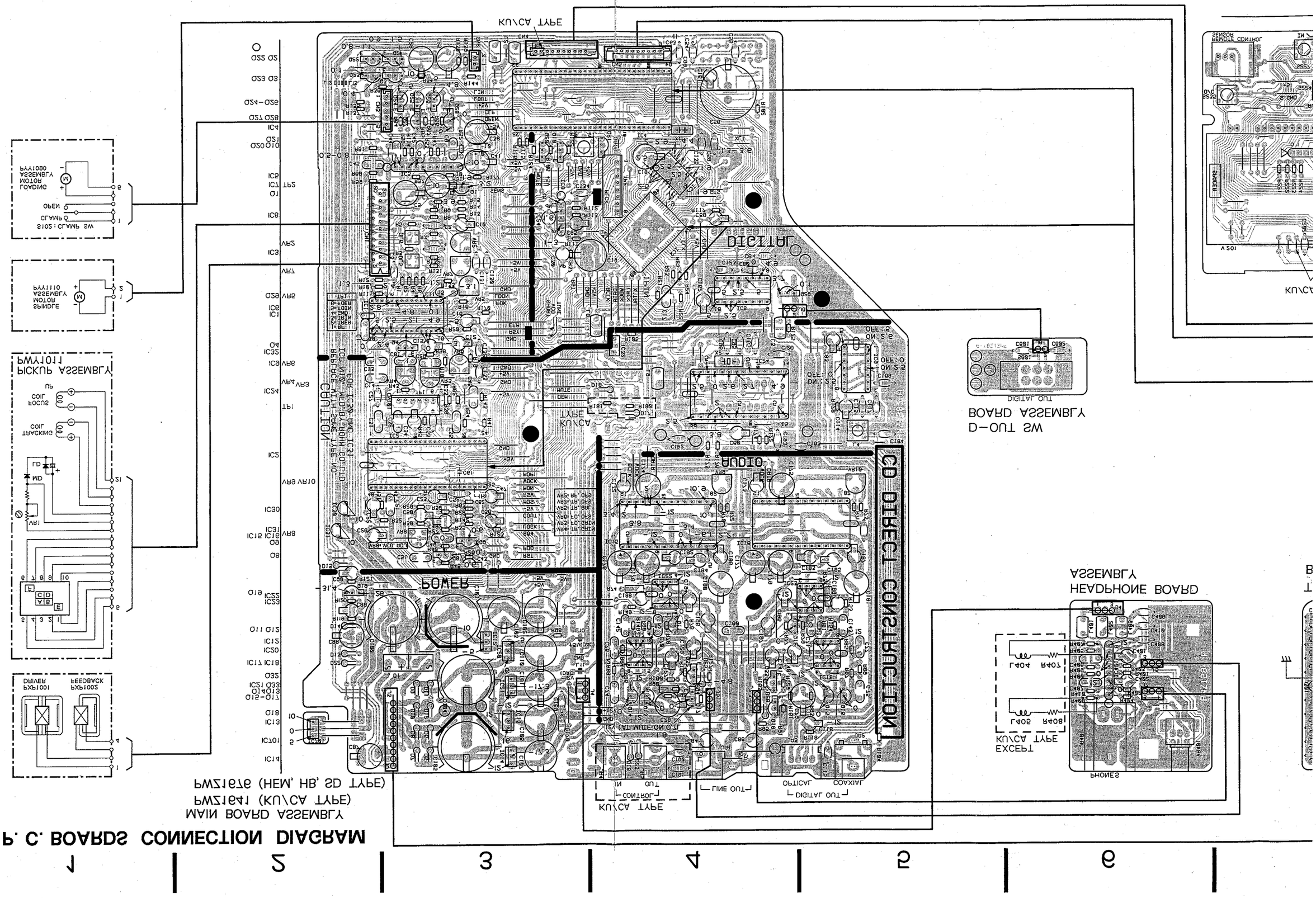
No.	Pin	Volts
1	0	0.2
2	0.2	0
3	0.2	0
4	0.2	0
5	0.2	0
6	0.2	0
7	0.2	0
8	1.0	0.0
9	0.2	0
10	0.2	0
11	8.4	0
12	0	8.4
13	0.2	8.4
14	0.2	0
15	0.2	0
16	0	0.2
17	0	0.2
18	0.2	0.2
19	0.2	0.2
20	0.2	0.2
21	0.2	0.2
22	0.2	0.2
23	0.2	0.2
24	0.2	0.2

IC501 (bD6010A)

No.	Pin	Volts
1	3.0	5.4 – 5.1
2	5.4 – 1.4	5.1 – 5.4
3	8.1	5.4 – 4.0
4	8.4	0.8 – 0.0
5	8.4	0
6	1.0	0.2
7	3.0	1.3 – 1.8
8	1.0	0.2 – 0.0
9	0.2	8.4
10	1.0	3.8 – 3.0
11	0	8.4
12	0.2	0
13	1.0	2.5 – 1.7
14	0.2	1.6 – 1.5
15	0.2	1.5 – 1.6
16	0.2	1.6 – 1.5
17	0.2	1.5 – 1.6
18	0.2	1.6 – 1.5
19	0.2	1.5 – 1.6
20	0.2	1.6 – 1.5
21	0.2	1.5 – 1.6
22	0.2	1.5 – 1.6
23	0.2	1.5 – 1.6
24	0.2	1.5 – 1.6

P. C. BOARDS CONNECTION DIAGRAM

MAIN BOARD ASSEMBLY
PWZ1647 (KU\CA TYPE)
PWZ1647 (HEM, HB, SD TYPE)



6. ELECTRICAL PARTS LIST

NOTES :
- Parts without part number cannot be supplied.
- Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5 %, and K = 10 %).

560 Ω → 56 × 10^1 → 561 ····· RD1/4PS 5 6 1 J
47k Ω → 47 × 10^3 → 473 ····· RD1/4PS 4 7 3 J
0.5 Ω → 0R5 ····· RN2H 0 R 5 K
1 Ω → 010 ····· RS1P 0 1 0 K

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62k Ω → 562 × 10^1 → 5621 ····· RN1/4SR 5 6 2 1 F

Miscellaneous Parts

Mark	Symbol & Description	Part No.
	Switch board unit	
	Transformer board assembly	
	Function board assembly	
◉	Main board assembly	PWZ1641
	Headphone board assembly	
	D – OUT SW board assembly	
	S102 Leaf switch (CLAMP)	VSK-015
⚠	Strain relief	CM-22C
⚠	AC power cord	PDG1015
⚠	Power transformer (120V)	PTT1109
	Remote control unit	PWW1038
	Motor assembly (LOADING)	PYY1090
	Spindle motor	PXM1009
	Pickup assembly	PWY1011
	Motor assembly (SPINDLE)	PYY1110
	Motor (LOADING)	PXM1002

Switch board unit

SWITCH

Mark	Symbol & Description	Part No.
⚠	S501 Power switch (POWER)	PSA-009

CAPACITOR

Mark	Symbol & Description	Part No.
⚠	C501 (0.01μF/AC250V)	RCG-009

Transformer board Assembly

CAPACITORS

Mark	Symbol & Description	Part No.
	C301 – C314	CKCYF103Z50

Function board Assembly

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC201	PDG010A
	Q201 – Q203	DTA124ES
	Q204 – Q206	2SC1740S
	D201	SLH-56MC3H
	D203	SLH-56VC3H
	D202	SLH-56YC3HYL

SWITCHES

Mark	Symbol & Description	Part No.
	S201 – S231, S233 – S236 Tact switch (TRACK No. KEY (1 – 10, + 10, ≧ 20); TRACK SEARCH (⏮, ⏭), INDEX SEARCH (↗, ↙) PROGRAM, CHECK, CLEAR, TIME, REPEAT, AUTO SPACE, AUTO RGM EDIT, TIME FADE EDIT, AUTO FADER (↗, ↘), MUSIC WINDOW, RANDOM PLAY, DISPLAY OFF, PAUSE (⏸), PLAY (▷), OPEN/CLOSE (⏏), STOP (■))	PSG-065

CAPACITORS

Mark	Symbol & Description	Part No.
	C203	CEAS330M16
	C202	CKDYF473Z50

RESISTORS

Mark	Symbol & Description	Part No.
	R217 Resistor array	RA10S473J
	Other resistors	RD1/6PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	V201 Fluorescent indicator tube	PEL1020
	X201 Ceramic resonator	VSS1014
	Remote control sensor	GP1U52X

◉Main board Assembly (PWZ1641)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC1	CXA1081S
	IC2	CXA1082BS
	IC3	CXD1135QZ
	IC7	CXK5816M-15L
⚠	IC32	ICP-F15
⚠	IC30,IC31	ICP-N10
⚠	IC8	M51957AL
	IC17,IC18	NJM2068DD
	IC22,IC23	NJM5532DD
	IC20	NJM7805FA
⚠	IC701	NJM7805FA
	IC13	NJM7812FA
⚠	IC12	NJM7905FA
	IC14,IC21	NJM7912FA
	IC15,IC16	PCM58P
	IC6	PD0026A
	IC4	PD3124
	IC24	SM5813AP
⚠	IC5	TA8410K
	IC9	TC74HCU04AP
	Q20,Q21,Q26	DTA124ES
	Q4,Q10,Q24,Q25,Q29	DTC124ES
	Q19	2SA1048
	Q1,Q3,Q23	2SA1399
	Q27	2SA854S
	Q8,Q9	2SC1740S
	Q28	2SC1741S
	Q11,Q12,Q17,Q18	2SC3068
	Q2,Q22	2SC3581
	Q32,Q33	2SD1302
	Q14,Q16	2SJ103
	Q13,Q15	2SK246
⚠	D14	HZS27NB2
⚠	D15	HZS5.1NB2
⚠	D1	RB-152LF
	D16 – D18,D23	1SS254
⚠	D5 – D13,D22	10E2

SWITCH

Mark	Symbol & Description	Part No.
	S1 Tact switch (TEST)	PSG-065

COILS

Mark	Symbol & Description	Part No.
	L1 – L3,L8,L9	LFA010K
	L4 Pulse transformer	PTL1003
	L10 – L13 Ferrite bead	VTH1024

CAPACITORS

Mark	Symbol & Description	Part No.
	C95	CCCCH070D50
	C96	CCCCH100D50
	C2,C4,C53	CCCCH300J50
	C165	CCCCH330J50
	C3	CCCCH390J50
	C120,C190	CCCSL101J50
	C117	CCCSL221J50
	C61,C62	CCDSL221J50
	C30	CEANP100M25
	C85	CEASR33M50
	C16,C22	CEASR47M50
	C10,C43,C118	CEAS101M10
	C194 – C197	CEAS101M25
	C60,C87 – C90,C127,C128,C140, C141,C174 – C181	CEAS101M50
	C19,C102,C103,C110,C111	CEAS102M16
	C106,C107	CEAS102M35
	C48,C172,C173,C182 – C187	CEAS3R3M50
	C23,C26,C36,C47,C50,C68,C83, C114,C161,C162	CEAS330M16
	C5,C7,C12,C15,C18	CEAS331M16
	C25,C28,C38,C41	CEAS331M35
	C34	CEAS4R7M50
	C100,C101	CENA222M16
	C78,C79	CENA470M50
	C33,C51	CFTXA102J50
	C14,C17,C46,C113,C160	CFTXA103J50
	C24,C31,C32,C35,C45	CFTXA104J50
	C44	CFTXA153J50
	C29	CFTXA272J50
	C13	CFTXA332J50
	C9,C11,C21	CFTXA333J50
	C42	CFTXA334J50
	C1,C27,C49	CFTXA472J50
	C81	CFTXA681J50
	C168	CGCYF473Z25
	C80,C123	CKCYB102K50
	C54,C59,C99,C130 – C135,C164, C169,C170,C191 – C193	CKCYF103Z50
	C6,C52,C55,C115,C163	CKCYF473Z50
	C76,C77	CQPYA103J2A
	C74,C75	CQPYA122J2A
	C70,C71	CQPYA752J2A
	C188,C189	CQSF101J50
	C84,C86	CQSF102J50
	C142,C143	CQSF681J50
	C104,C105 (2200/35V)	VCH1032
	C63	CKDYF473Z50

RESISTORS

Mark	Symbol & Description	Part No.
	VR2 Semi-fixed (10kΩ)	VRTB6VS103
	VR9,VR10 Semi-fixed (100kΩ)	VRTB6VS104
	VR3-VR7 Semi-fixed (22kΩ)	VRTB6VS223
	VR8 Semi-fixed (1kΩ)	VRTS6VS102
	R74,R75,R90,R91	RDR1/4PM□□□J
	R30	RN1/6PQ3601F
	Other resistors	RD1/6PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	JA2 1P Pin jack	PKB1004
	JA1 2P Pin jack	PKB1011
	JA4,JA5 Remote control jack	RKN1004
	JA3 Optical digital output terminal	TOTX172
	X1 Ceramic resonator (4.0MHz)	FCR4.0MC
	X2 Crystal resonator	PSS1001
	DL5,DL6 Delay line	PTF1009

Headphone board Assembly

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
	IC401	M5218L

COILS

Mark	Symbol & Description	Part No.
	L401 – L403	LFA010K

CAPACITORS

Mark	Symbol & Description	Part No.
	C401,C402	CEAS330M16
	C406,C407	CFTXA104J50
	C408 – C410	CKCYF103Z50

RESISTORS

Mark	Symbol & Description	Part No.
	VR401 Variable resistor (20kΩ) (PHONES LEVEL)	PCS1002
	R400 – R405,R407 – R410	RD1/6PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	JA401 Headphone jack	RKN1001

D – OUT SW board Assembly

SWITCH

Mark	Symbol & Description	Part No.
	S601 Slide switch (DIGITAL OUT)	PSH1007

CAPACITORS

Mark	Symbol & Description	Part No.
	C601,C602	CKCYF103Z50

7. ADJUSTMENTS

The adjustments for this unit are given below. Adjustments must be made in the order in which they are listed.

● Adjustments and check items

1. Tracking offset, focus offset and RF offset adjustment
2. RF level adjustment
3. LD (Laser Diode) power check
4. Focus lock and spindle lock check
5. Grating adjustment
6. Tracking balance adjustment
7. Tangential adjustment
8. Radial adjustment
9. Focus gain adjustment
10. Tracking gain adjustment
11. VCO free-run frequency adjustment
12. Method for checking S character (focus error)
13. MSB adjustment

● Measuring equipment

1. Dual trace oscilloscope
2. Optical power meter
3. Test disc (YEDS-7), 8 cm disc
4. Loop gain adjustment filter
5. Signal generator
6. Frequency counter
7. Other regular measuring equipment

● About the test mode

How to activate and release the test mode

① To activate the test mode, turn ON the power switch (S501) with the test mode switch (S1) in the ON position.

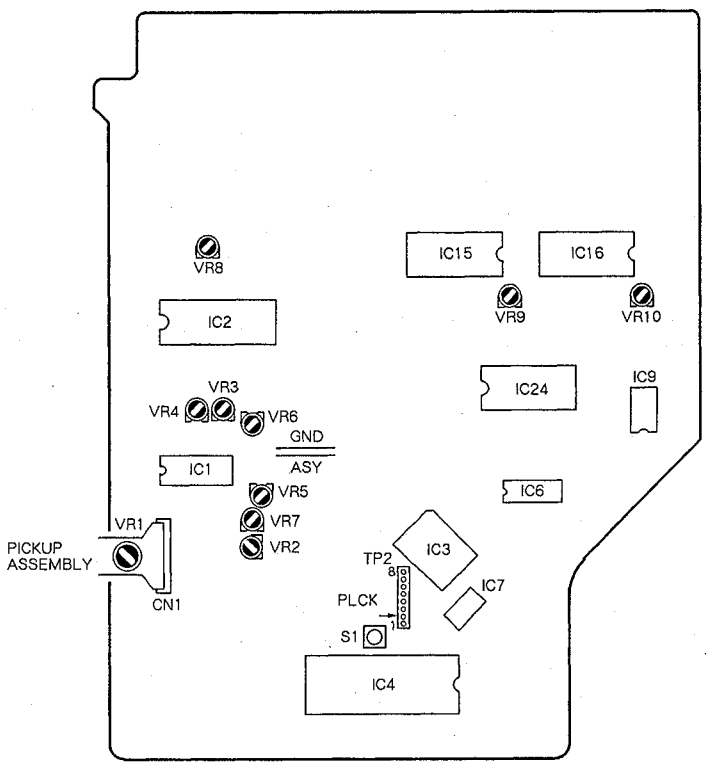
② The test mode is released by turning the power switch OFF.

The functions of the keys in the test mode are outlined in Table 7-1.

● Adjustment VRs and their names

VR1 : Laser power
VR2 : RF offset (RF. OFS)
VR3 : Focus gain (FCS. GAN)
VR4 : Tracking gain (TRK. GAN)
VR5 : Tracking balance (TRK. BAL)
VR6 : Focus offset (FCS. OFS)
VR7 : Tracking offset (TRK. OFS)
VR8 : VCO adjustment (VCO. ADJ)
VR9,VR10 : MSB adjustment

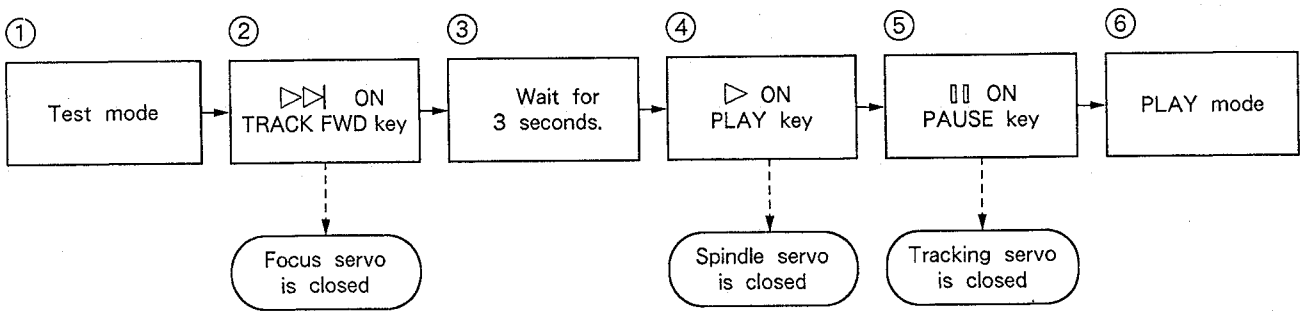
Adjustment Point



In the test mode, the servos must be closed and opened individually. Consequently, the servos must each be closed in the proper sequence (serial sequence) in order to put the machine into the play mode. Note also that the machine will not enter the play mode when the PAUSE (▯▯) key is pressed.

For example, in order to change from the stop to the play mode, the function keys must be pressed in the following order.

* In the test mode, the servos must be operated in serial sequence.



• Key Functions in Test Mode

Symbol	Key name	Function in test mode	Description
▷▷|	TRACK FWD	Focus servo close	Turns ON the laser diode, and raises and lowers the focusing actuator to close the focus servo.
▷	PLAY	Spindle servo close	Closes the servo in the CLV-A mode after kicking the spindle motor.
▯▯	PAUSE	Tracking servo close/open	Acts as a toggle : closes the tracking servo and activates play mode when pressed (provided the focus and spindle servos are closed), at which time the PAUSE indicator illuminates ; opens the tracking servo when pressed again.
◁◁	MANUAL SEARCH REV	Carriage reverse (moves inward)	Moves carriage quickly (3cm/s) toward innermost track. Be careful not to move too far as there is no safety device to stop the carriage.
▷▷	MANUAL SEARCH FWD	Carriage forward (moves outward)	Moves carriage quickly (3cm/s) toward outermost track. Be careful not to move too far as there is no safety device to stop the carriage.
□	STOP	Stop	Stops all servos and returns system to its initial state.
⏏	OPEN/CLOSE	Disc tray open/close	Opens and closes the disc tray. However, pickup does not return to rest on OPEN, and it remains stationary on CLOSE.

Table 7-1

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
1	**Tracking offset, focus offset and RF offset adjustment**					
			TP1 Pin 2 (TRK. ERR) TP1 Pin 6 (FCS. ERR) TP1 Pin 1 (RF OUTPUT)	VR5 (TRK. BAL) VR7 (TRK. OFS) VR6 (FCS. OFS) VR2 (RF. OFS)	Tracking offset 45° 0V ± 50mV FOCUS offset 0V ± 50mV RF offset 100mV ± 50mV	● Put unit in the test mode. (※) ● Set VR5 TRK. BAL (tracking balance) to the position about 45° to the left of center. ● Adjust VR7 TRK. OFS (tracking offset) so that the TRK. ERR (tracking error) voltage at TP1 pin 2 becomes 0V ± 50mV. ● Adjust VR6 FCS. OFS (focus offset) so that the FCS. ERR (focus error) voltage at TP1 pin 6 becomes 0V ± 50mV. ● Adjust VR2 RF. OFS (RF offset) so that the RF output voltage at TP1 pin 1 becomes 100mV ± 50mV. Note : When adjusting the tracking offset, always perform "6. Tracking balance adjustment."
2	**RF level adjustment**					
			TP1 Pin 1 (RF OUTPUT)	VR1 (Laser power)	1.5Vp-p $^{+0.2V}_{-0V}$	● Put unit in the test mode. (※) ● Connect the oscilloscope to TP1 pin 1 (RF output), play the test disc, and measure the P-P voltage of the RF waveform. ● Adjust VR1 (Laser power) so that the voltage is 1.5Vp-p $^{+0.2V}_{-0V}$.
3	**LD (laser diode) power check**					
					Less than 0.13mW	● Put unit in the test mode. (※) ● Press the TRACK FWD (▷▷|) key to turn ON the laser diode (LD). ● Place the sensor of the optical power meter directly above the objective lens and confirm that the LD power is less than 0.13mW.
4	**Focus lock and spindle lock check**					
	0.5V/div	100msec /div	TP1 Pin 1 (RF output)		RF signal is output. Forward (clockwise) rotation	● Set the test disc. ● Put unit in the test mode. (※) ● Press the MANUAL SEARCH FWD (▷▷) key to move the pickup to the center of the disc. ● Observe the output of TP1 pin 1 (RF output) on the oscilloscope. Confirm that the RF signal is output after the TRACK FWD (▷▷|) key is pressed. ● Press the PLAY (▷) key and confirm that the disc rotates at constant speed (approx. 300 rpm) near center of disc in the forward (clockwise) direction ; disc may not run away or rotate counterclockwise.

※ : See page 30.

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
5	**Grating Adjustment (1) (When an 8 cm disc is used.)**					

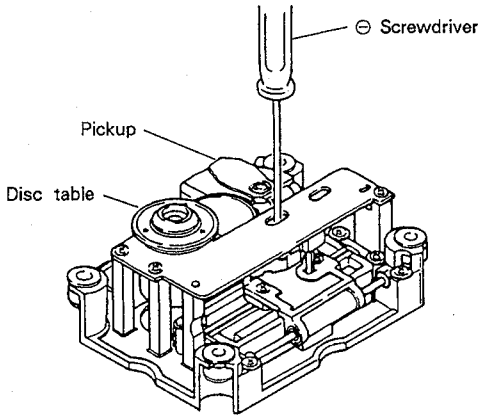


Fig. 7-1

Note : This adjustment can be made by using an 8 cm disc, having pits within the diameter range of 75 mm.

- Put unit in the test mode. (※)
- Press the MANUAL SEARCH FWD (▷▷) key to move the pickup to the center of the disc, so that the grating adjustment screw of the pickup can be viewed through the oval hole (one of the oval holes which is near to the spindle motor) on the base plate of the servo mechanism.
- As shown in Fig. 7-1, insert a (slotted) ⊖ screwdriver from the top of the mechanism and check that the grating adjusting screw can be rotated.
- Mount the test disc.
- Press the TRACK FWD key (▷▷|) and PLAY key (▷) in sequence to close the focus servo and spindle servo (do not turn on the tracking servo).
- Observe the TRK.ERR (tracking error) waveform at TP1 pin 2 on an oscilloscope, inserting a 4 kHz low-pass filter (see Fig. 7-2).

0.5V/div	5msec /div	TP1 Pin 2 (TRK. ERR)	Grating adjustment screw	Null point
			Grating adjustment screw	Maximum amplitude

- Insert a ⊖ screwdriver into the grating hole, turn and find the null point (see Photo 7-1).
- Next, slowly turn the ⊖ screwdriver COUNTERCLOCKWISE from the null point and adjust until the waveform (tracking error signal) reaches maximum amplitude (see Photo 7-2).

Note : Use caution since inserting the ⊖ screwdriver forcefully will cause the pickup unit to float upward.

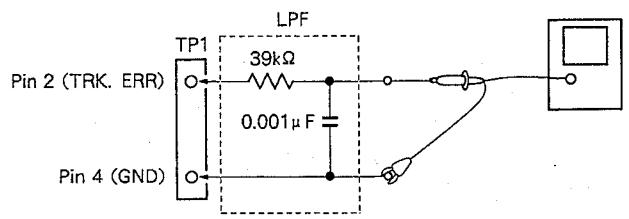


Fig. 7-2

- Lastly, make sure that there is no major fluctuation in the p-p voltage of the tracking error signal (do not insert the cutoff 4 kHz low-pass filter) when the pickup is moved to the inner and outer periphery. If there is a difference of more than ±10% again turn the grating adjustment screw and adjust the tracking error signal to maximum.

※ : See page 30.

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
5'	**Grating adjustment (2) (When no 8 cm disc is available.)**					

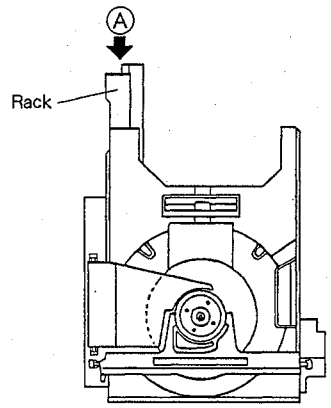


Fig. 7-3

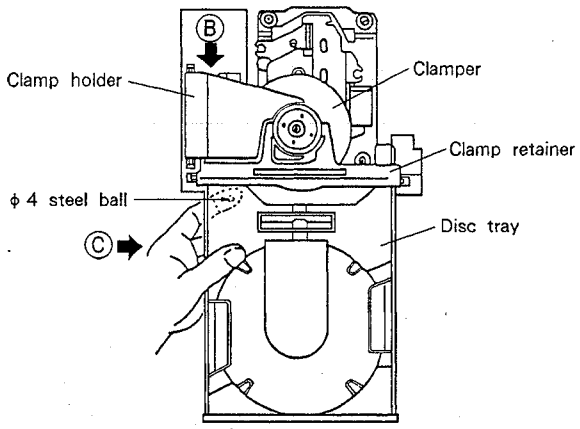


Fig. 7-4

This adjustment is made if no 8 cm disc is available and the grating adjustment (1) cannot be effectuated. Remove the disc tray to perform this adjustment.

● Removal of the disc tray

1. Press the rear edge of the rack, (＊1) marked Ⓐ in Fig. 7-3, while pulling the disc tray out to the position where it catches, illustrated in Fig. 7-4.

(＊1) When the rear edge of rack Ⓐ is pressed, first the disc clamp is released. If you continue pressing after it has been released completely, the disc tray is ejected.

2. While pulling the clamp holder Ⓑ (see Fig. 7-4) upward with the right hand, hold the tray as indicated by Ⓒ in the left hand and pull it outward. Take care not to allow the ϕ4 steel ball to fall (we recommend holding the ball in place with the left index finger while extracting the tray.)

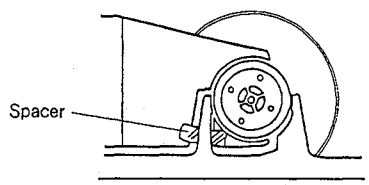


Fig. 7-5

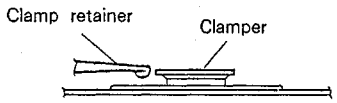


Fig. 7-6

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
						● Put unit in the test mode. (※) ● Press the MANUAL SEARCH FWD (▷▷|) key to move the pickup to the center of the disc, so that the grating adjustment screw of the pickup can be viewed through the oval hole (one of the oval holes which is near to the spindle motor) on the base plate of the servo mechanism. ● As shown in Fig. 7-7, insert a (slotted) ⊖ screwdriver from the top of the mechanism and check that the grating adjusting screw can be rotated. ● Mount the test disc ; be sure to insert a 3-5 mm spacer (if no spacer is available, use a hex wrench) between the clamp holder and clamp retainer, as shown in Fig. 7-5. ● Confirm that the clamper and the clamp retainer are not contacting one another (Fig. 7-6). ● Press the TRACK FWD (▷▷|) and the PLAY (▷) keys sequentially to close the focus and spindle servos (do not close the tracking servo). ● Insert a 4 kHz-cutoff low pass filter between the oscilloscope and TP1 pins 2 (TRK. ERR) and 4 (GND) as shown in Fig. 7-8 and observe the waveform of TP1 pin 2 (tracking error) on the oscilloscope.
	0.5V/div	5msec /div	TP1 Pin 2 (TRK. ERR)	Grating adjusting screw Grating adjusting screw	Null point Maximum amplitude	● Turn the grating adjusting screw with the ⊖ screwdriver to find the null point (see Photo 7-1.). ● Next, slowly turn the ⊖ screwdriver COUNTERCLOCKWISE and adjust to the point where the waveform (tracking error signal) first achieves its maximum amplitude (see Photo 7-2). Note : Avoid applying pressure to the ⊖ screwdriver while adjusting the screw. Doing so causes the pickup to move inward, making adjustment more difficult. ● Lastly, remove the low pass filter and confirm that the tracking error signal (do not insert the cutoff 4 kHz low-pass filter) p-p voltage does not greatly vary when the pickup is moved to the inner-most and outer-most tracks of the disc. If the levels diverge by ±10% or more, re-adjust the maximum error amplitude point by turn the grating adjusting screw.

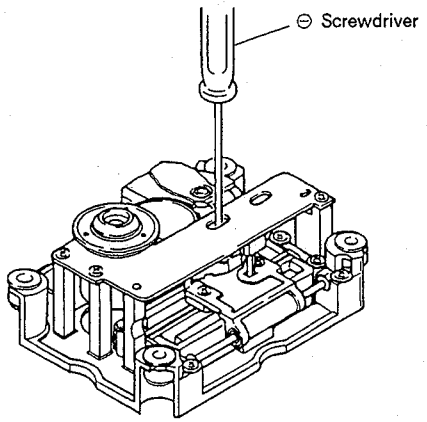


Fig. 7-7

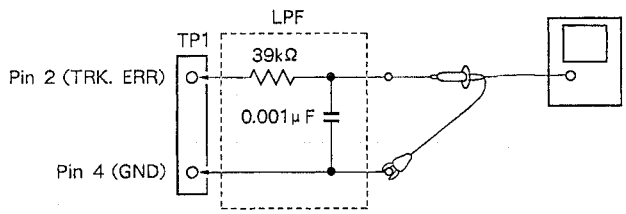


Fig. 7-8

※ : See page 30.

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
						Re-mount the disc tray according to the following procedure when the grating adjustment is complete. 1. Remove the disc and the spacer. 2. While lifting the clamp holder [marked Ⓑ in Fig. 7-4] with the right hand, hold the tray in the left hand as indicated by Ⓒ and slide the slide base into the hard resin fittings on the loading base as shown in Fig. 7-9 to re-insert the disc tray. At this time, be sure to hold the steel ball in place with the index finger of the left hand. Also, be careful that the front panel is not damaged by the slide base and bearing of the steel ball's bearing (in the slide base) coming into contact with the panel. 3. Insert the slide base so that it fits into the two hard resin fittings at the rear of the loading base (see Fig. 7-10). 4. Insert the tray tightly.

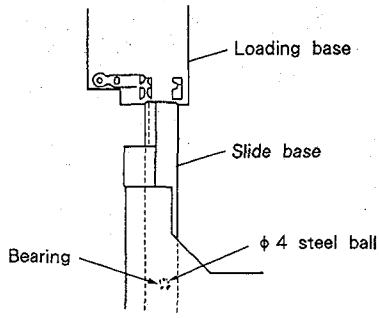


Fig. 7-9

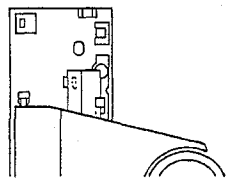


Fig. 7-10

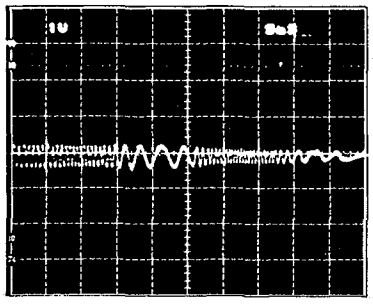


Photo 7-1
Null point

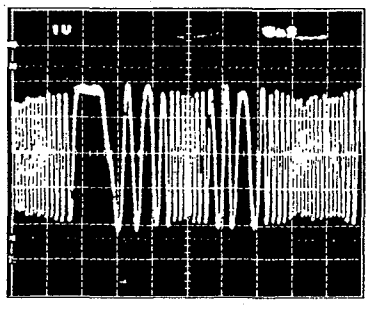


Photo 7-2
Maximum amplitude

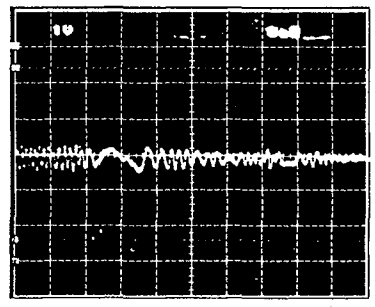
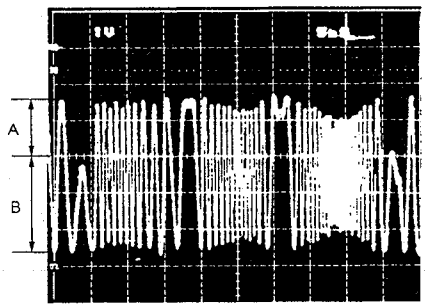


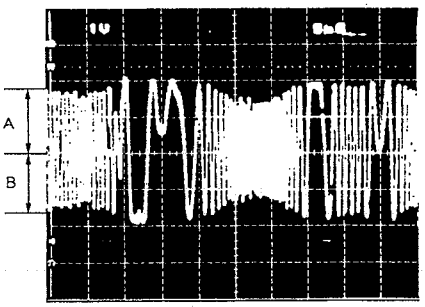
Photo 7-3
This is not the null-point waveform.

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
6	**Tracking balance adjustment**					
	0.5V/div	5msec /div	TP1 Pin 2 (TRK. ERR)	VR5 (TRK. BAL)		● Load the test disc. ● Put unit in the test mode. (※) ● Press the MANUAL SEARCH FWD (▷▷) key to position the pickup near the center of the disc. ● Press the TRACK FWD (▷▷|) and PLAY (▷) keys sequentially to cause the disc to rotate. ● Observe TP1 pin 2 TRK. ERR (tracking error) on the oscilloscope and adjust VR5 TRK. BAL (tracking balance) to eliminate the DC elements from the tracking error signal.



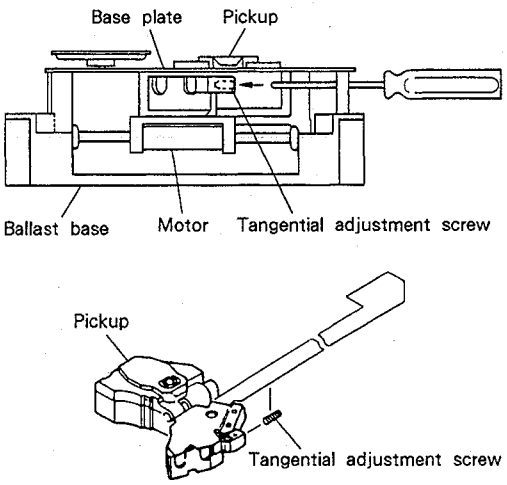
A ≠ B

Photo 7-4 DC elements mixed in signal



A = B

Photo 7-5 DC elements eliminated

7	**Tangential adjustment**	
	 Fig. 7-11	● Put unit in the test mode. (※) ● Open the tray and load the test disc. ● Press the MANUAL SEARCH FWD (▷▷) key to position the pickup near the center of the disc. ● Insert a hex wrench into the tangential adjustment screw section from the rear of the mechanism. ● Close the tray. Note : Do not use an L-shaped hex wrench. Use one such as shown to the left. Using an L-shaped hex wrench can cause the tray to come loose (see page 34 5'. Grating adjustment (2)). ● Press the TRACK FWD (▷▷|), PLAY (▷), and PAUSE (▯▯) keys sequentially to close the all servos (PAUSE indicator will illuminate).

※ : See page 30.

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
		200nsec /div	TP1 Pin 1 RF output	Tangential adjustment screw	Sharpest possible eye pattern	● Observe TP1 pin 1 (RF output) on the oscilloscope and adjust the tangential adjustment screw to achieve the sharpest possible eye pattern. ● The point to which the adjusting screw should be set lies about halfway between the points at which the eye pattern becomes most blurred when the screw is rotated clockwise and counterclockwise. When the whole waveform becomes clear, concentrate on sharpening the fine lines forming the diamond at the center of the eye pattern (see Photo 7-8). Adjust until the fine lines on all four sides of the diamond are both sharply defined and dense, as shown in Photo 7-6. Note : Use a hex wrench to raise the pickup some what while making this adjustment.

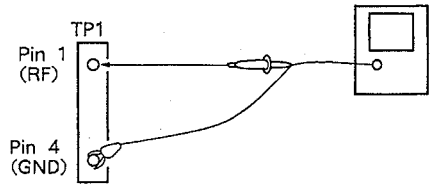


Fig. 7-12

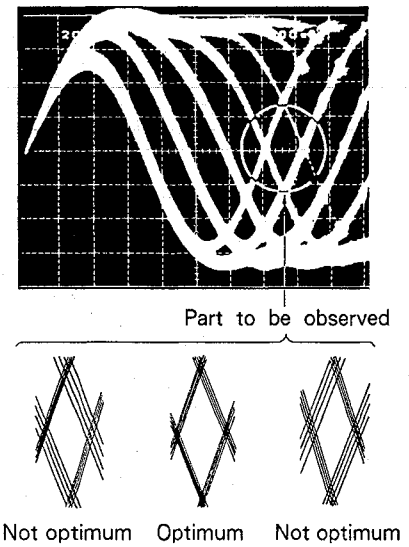


Photo 7-6

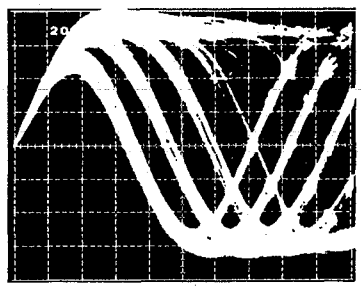


Photo 7-7

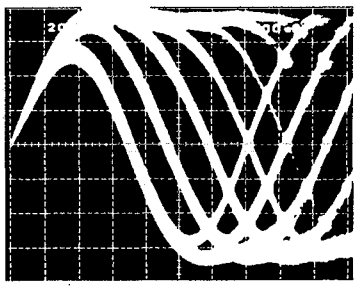


Photo 7-8

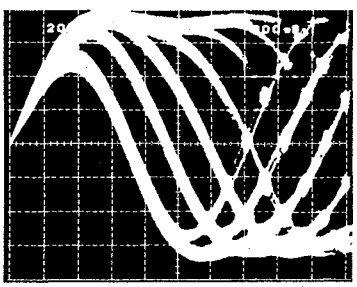


Photo 7-9

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
8	**Radial adjustment**					
			TP1 Pin 1 (RF output)	Radial adjustment screw	Sharpest possible eye pattern	Remove the disc tray before beginning this adjustment. Note : Refer to page 34 "5'. Grating adjustment (2)" for the removal of the disc tray. ● Load the test disc. ● Put unit in the test mode. (※) ● Press the MANUAL SEARCH FWD (▷▷) key to move the pickup to the center of the disc, so that tangential adjustment screw can be viewed from the top (refer to Fig. 7-11). ● Press the TRACK FWD (▷▷|), PLAY (▷), and PAUSE (▯▯) keys sequentially to close all servos (PAUSE indicator will illuminate). ● Observe TP1 pin 1 (RF output) on the oscilloscope and adjust the radial adjustment screw to achieve the sharpest possible eye pattern. (Fig. 7-13) ● When the whole waveform becomes clear, concentrate on sharpening the fine lines forming the diamond at the center of the eye pattern (see Photo 7-8). Adjust until the fine lines on all four sides of the diamond are both sharply defined and dense, as shown in Photo 7-6. ● Perform the tangential adjustment and the radial adjustment twice or more alternately. ● When the adjustment is completed, replace the disc tray (see page 36).

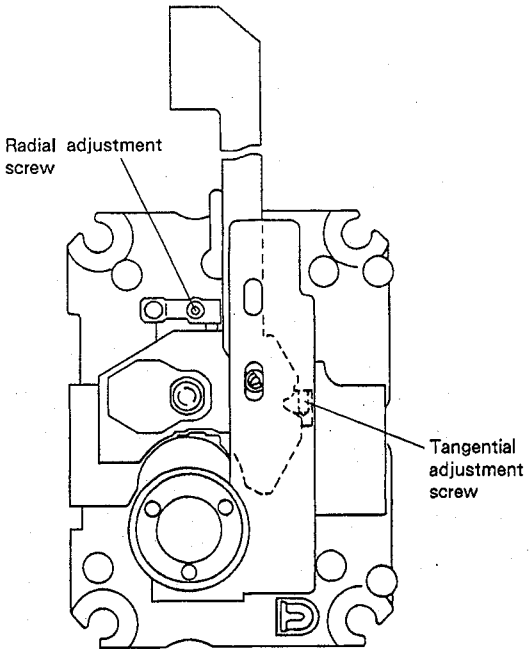


Fig. 7-13

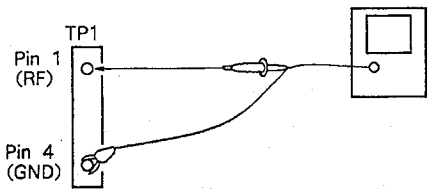


Fig. 7-14

※ : See page 30.

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
9	**Focus gain adjustment**					
	20mV/div CH1 (X) 5mV/div CH2 (Y) (prove 10 : 1)		X-axis : TP1 Pin 5 (FCS. IN) Y-axis : TP1 Pin 6 (FCS. ERR)	VR3 (FCS. GAN)	Phase difference of 90°	● In the POWER OFF state, connect the oscilloscope and oscillator as shown in Fig. 7-13. ● Set the unit to the normal PLAY mode. ● Turn ON the power to the oscillator and set it to output a 1.2kHz 1Vp-p signal. Note : Some oscillators discharge a DC voltage when turned on. It is therefore recommended that the oscillator be connected after it has been turned on. ● Adjust VR3 FCS. GAN (focus gain) so that the Lissajous's figure becomes a horizontal circle (phase difference of 90°)

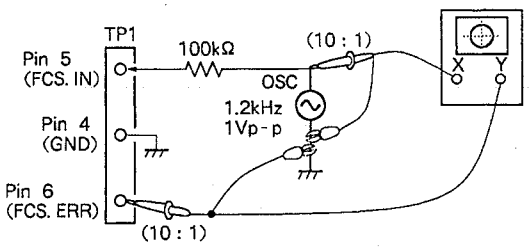


Fig. 7-13

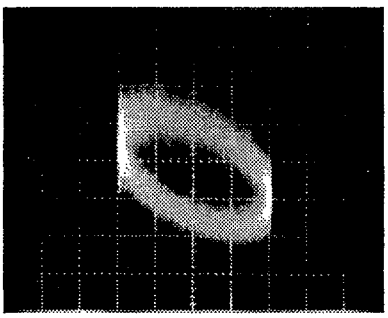


Photo 7-10
High gain

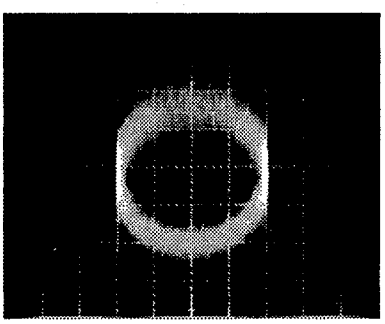


Photo 7-11
Optimum gain

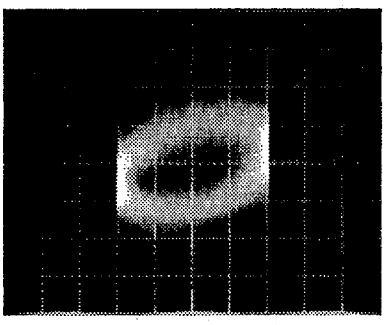


Photo 7-12
Low gain

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
10	**Tracking gain adjustment**					
	50mV/div CH1 (X) 5mV/div CH2 (Y) (prove 10 : 1)	X-axis : TP1 Pin 3 (TRK. IN) Y-axis : TP1 Pin 2 (TRK. ERR)	VR4 (TRK. GAN)	Phase difference of 90°	● Adjust VR4 TRK. GAN (tracking gain) so that the Lissajous's figure becomes a horizontal circle (phase difference of 90°).	● In the POWER OFF state, connect the oscilloscope and oscillator as shown in Fig. 7-14. ● Set the unit to the normal PLAY mode. ● Turn ON the power to the oscillator and set it to output a 1.2kHz 2Vp-p signal. Note : some oscillators discharge a DC voltage when turned on. It is therefore recommended that the oscillator be connected after it has been turned on.

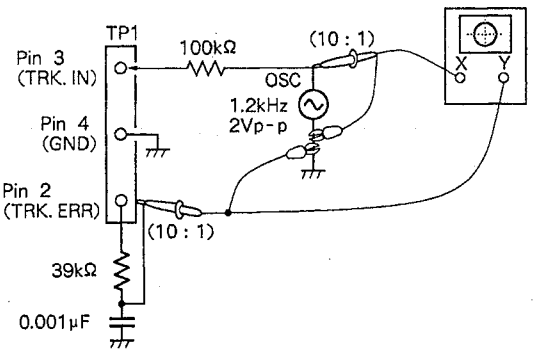


Fig. 7-14

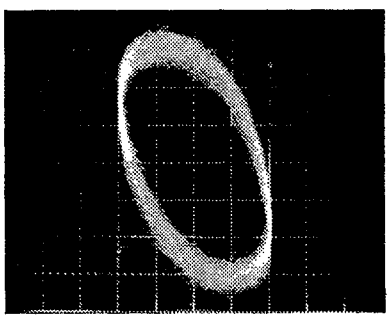


Photo 7-13
High gain

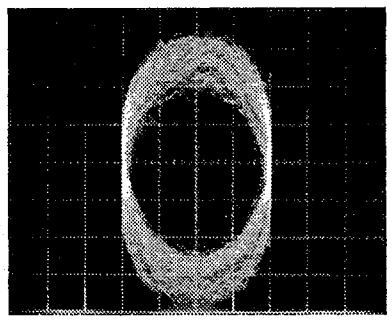


Photo 7-14
Optimum gain

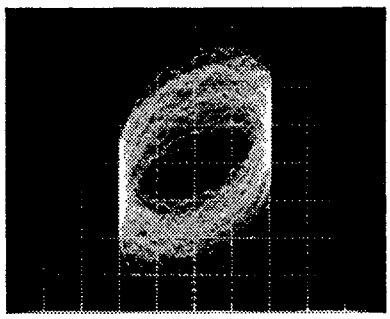
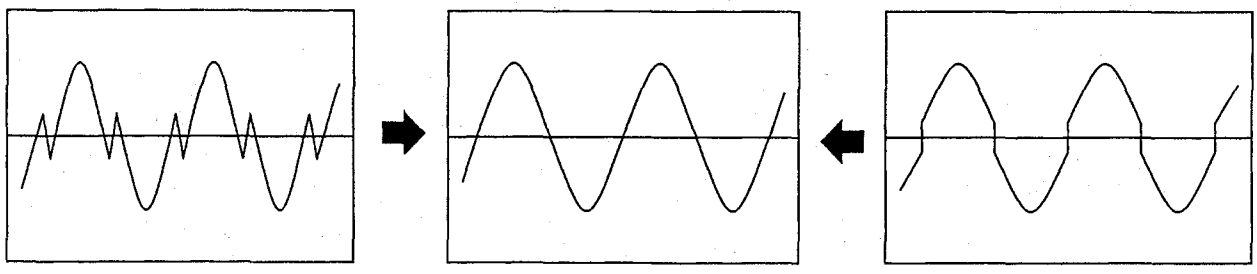


Photo 7-15
Low gain

Step No.	Oscilloscope Setting V	Oscilloscope Setting H	Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
11	**VCO free-run frequency adjustment**					
			TP2 Pin 2 (PLCK)	VR8 (VCO. ADJ)	4.275 ± 0.025MHz	● Put unit in the test mode. (※) ● Short the ASY and GND jumper with a ⊖ screwdriver or similar tool. (※) ● Connect a frequency counter capable of measuring frequencies of 10MHz and above to TP2 pin 2 (PLCK). ● Adjust VR8 (VCO adjustment) so that the frequency counter reading becomes 4.275 ± 0.025MHz.
12	**Method for checking S character (focus error)**					
			TP1 Pin 6 (FCS. ERR)			● Put unit in the test mode. (※) ● Ground TP1 pin 5 FCS. IN (focus in) to GND. ● Observe the waveform output by TP1 pin 6 FCS. ERR (focus error) when the TRACK FWD (▷▷|) key is pressed.
13	**MSB adjustment**					
	5mV/div	0.2msec /div	JA1 LINE OUTPUT terminal (L CH)	VR9	Sine wave	● Set the unit to the normal PLAY mode. ● Playback the track 20 (− 60 dB, 1kHz, Lch, Rch) of the test disc (YEDS-7). Connect the oscilloscope to the Lch of the LINE OUTPUT terminal (JA1), and observe the audio output waveform. ● Adjust VR9 MSB (L ch) so that the sine wave is obtained on the oscilloscope.
			JA1 LINE OUTPUT terminal (R CH)	VR10	Sine wave	● Adjust VR10 (R ch) in the same way.

● ZERO cross distortion waveform



NG　　OK　　NG

※ : See page 30.

7. RÉGLAGE

On trouvera ci-après les réglages requis pour cet appareil. Ils doivent être exécutés dans l'ordre donné.

● Réglages et items de vérification

1. Réglage de compensation, de mise au point et RF.
2. Réglage du niveau RF
3. Vérification d'alimentation de diode laser (LD).
4. Vérification de verrouillage de mise au point et de verrouillage d'axe
5. Réglage du grincement
6. Réglage d'équilibre d'alignement
7. Réglage tangentiel
8. Réglage radial
9. Réglage de gain de mise au point
10. Réglage de gain d'alignement
11. Réglage de fréquence libre VCO
12. Méthode de confirmation du caractère S (erreur de mise au point)
13. Réglage de MSB

● Matériel de mesure

1. Oscilloscope cathodique à deux faisceaux.
2. Wattmètre optique
3. Disque d'essai (YEDS-7), disque de 8 cm
4. Filtre d'ajustement de gain de boucle
5. Générateur de signal
6. Fréquencemètre
7. Tournevis, pinces, fer à souder, etc.

● Apropos du mode d'essai

Mise en/hors service du mode d'essai

① Pour actualiser le mode d'essai, allumer (ON) l'interrupteur d'alimentation (S501) après avoir placé l'interrupteur du mode d'essai (S1) à la position ON.

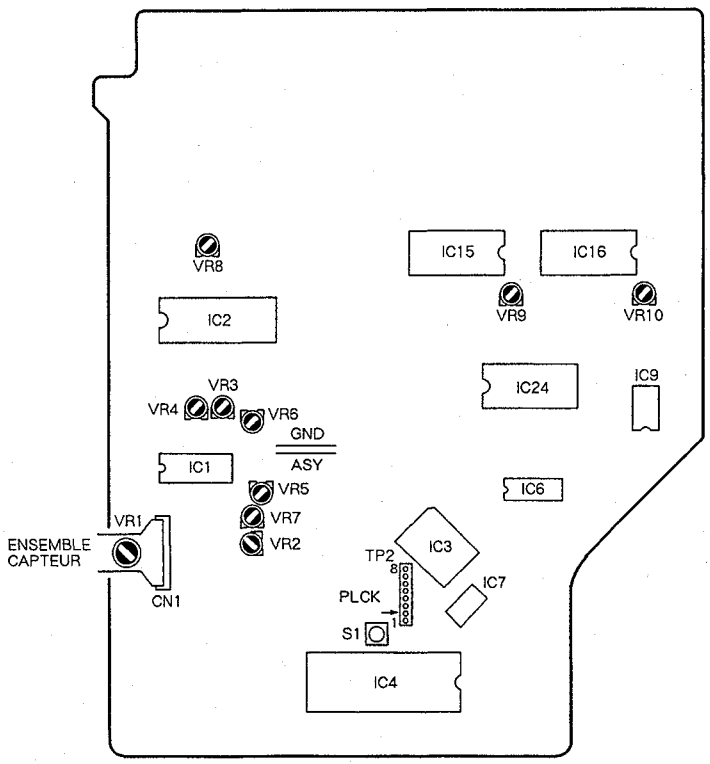
② Le mode d'essai est annulé en ramenant l'interrupteur d'alimentation sur OFF.

Les fonctions des touches en mode d'essai sont décrites au Tableau 7-1.

● Dispositifs d'ajustement et nomenclature

VR1 : Puissance laser
VR2 : Décalage RF (RF. OFS)
VR3 : Gain de mise au point (FCS. GAN)
VR4 : Gain d'alignement (TRK. GAN)
VR5 : Equilibrage d'alignement (TRK. BAL)
VR6 : Décalage de mise au point (FCS. OFS)
VR7 : Décalage d'alignement (TRK. OFS)
VR8 : Ajustement VCO (VCO. ADJ)
VR9,VR10 : Ajustement MSB

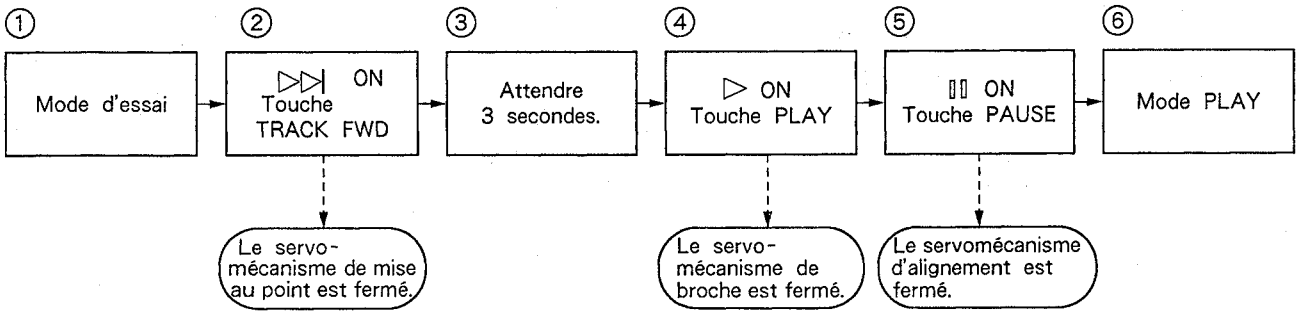
Points de réglage



En mode d'essai, les servos doivent être fermés et ouverts individuellement. En conséquence, les servos doivent chacun être fermés dans la séquence correcte (séquence sérielle) afin de placer l'appareil en mode de lecture. Remarquer également que l'appareil ne se placera pas en mode de lecture par une poussée sur la touche PAUSE (▯▯).

Par exemple, pour passer du mode d'arrêt au mode de lecture, les touches de fonction doivent être actionnée dans l'ordre suivant.

* En mode d'essai, les servos doivent être opérés en séquence sérielle.



• Fonctions des touches en mode d'essai

Symbole	Nom de touche	Fonction en mode d'essai	Description
▷▷|	TRACK FWD	Servo de mise au point fermé	Allume la diode laser et élève ou abaisse l'actuateur de mise au point pour fermer le servo de mise au point.
▷	PLAY	Servo d'axe fermé	Ferme le servo en mode CLV-A après cognement du moteur d'axe.
▯▯	PAUSE	Fermture/ouverture de servo d'alignement	Agit comme interrupteur articulé: ferme le servo d'alignement et active le mode de lecture quand poussé (pourvu que les servos de mise au point et d'alignement soient fermés), auquel moment le témoin PAUSE s'allume ; ouvre le servo d'alignement à la poussée suivante.
◁◁	MANUAL SEARCH REV	Inversion du chariot (déplacement vers l'intérieur)	Déplace rapidement (3 cm/sec) le chariot vers la plage la plus au centre. Prendre garde à ne pas déplacer trop loin car il n'existe pas de dispositif de sécurité pour arrêter le chariot.
▷▷	MANUAL SEARCH FWD	Avance du chariot (déplacement vers l'extérieur)	Déplace repidement (3 cm/sec) le chariot vers la plage la plus à l'extérieur. Prendre garde à ne pas déplacer trop loin car il n'existe pas de dispositif de sécurité pour arrêter le chariot.
□	STOP	STOP	Arrête tous les servos et ramène le système à l'état initial.
⏏	OPEN/CLOSE	Ouverture/fermeture du plateau de disque	Ouvre et ferme le plateau du disque. Cependant, le capteur ne revient pas à la position de repos à OPEN et il reste stationnaire à CLOSE.

Tableau 7-1

N° de étape	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Points d'essai	Points de réglage	Postes de contrôle / Spécifications de réglage	Procédure de réglage
1	**Réglage de compensation, de mise au point et RF.**					
			TP1 Broche 2 (TRK. ERR)	VR5 (TRK. BAL)	Décalage d'alignement 45°	● Placer l'appareil en mode d'essai. (※) ● Régler VR5 TRK. BAL (équilibrage d'alignement) à la position environ à 45° à la gauche du centre.
				VR7 (TRK. OFS)	0V ± 50mV	● Régler VR7 TRK. OFS (décalage d'alignement) de sorte que la tension TRK. ERR (erreur d'alignement) à TP1 broche 2 devienne 0V ± 50mV.
			TP1 Broche 6 (FCS. ERR)	VR6 (FCS. OFS)	Décalage de mise au point 0V ± 50mV	● Régler VR6 FCS. OFS (décalage de mise au point) de sorte que la tension FCS. ERR (erreur de mise au point) à TP1 broche 6 devienne 0V ± 50mV.
			TP1 Broche 1 (RF OUTPUT)	VR2 (RF. OFS)	Décalage RF 100mV ± 50mV	● Régler VR2 RF. OFS (décalage RF) de sorte que la tension de sortie RF à TP1 broche 1 devienne 100mV ± 50mV. Remarque : Lors de l'ajustement de la compensation, effectuer toujours "6." Réglage d'équilibre d'alignement".
2	**Réglage du niveau RF**					
			TP1 Broche 1 (RF OUTPUT)	VR1 (Puissance laser)	1,5Vc-c $^{+0,2V}_{-0V}$	● Placer l'appareil en mode d'essai. (※) ● Raccorder l'oscilloscope à TP1 broche 1 (sortie RF), reproduire le disque d'essai et mesurer la tension P-P de la forme d'onde RF. ● Régler VR1 (puissance laser) de façon que la tension soit de 1,5Vc-c $^{+0,2V}_{-0V}$.
3	**Vérification d'alimentation de diode laser (LD)**					
					Moins de 0,13mW	● Placer l'appareil en mode d'essai. (※) ● Appuyer sur les touches TRACK FWD (▷▷|) pour allumer la diode laser (LD). ● Placer le puissance-mètre optique directement sur la lentille et vérifier que la puissance de la diode laser (LD) est inférieure à 0,13mW.
4	**Vérification de verrouillage de mise au point et de verrouillage d'axe**					
	0,5V/div	100msec /div	TP1 Broche 1 (sortie RF)		Le signal RF est fourni. Rotation avant (Sens des aiguilles)	● Installer le disque d'essai. ● Placer l'appareil en mode d'essai. (※) ● Appuyer sur la touche MANUAL SEARCH FWD (▷▷) pour amener le capteur au centre du disque. ● Observer la sortie de TP1 broche 1 (sortie RF) sur l'oscilloscope. Confirmer que le signal haute fréquence est fourni après que la touche TRACK FWD (▷▷|) est actionnée. ● Appuyer sur la touche PLAY (▷) et confirmer que le disque tourne à vitesse constante (env. 300 tr/mn près du centre du disque) dnas le sens avant (sens des aiquilles). Il peut arriver que le disque ne tourne pas ou tourne dans le sens contraire des aiguilles.

※ : Voir page 43.

N° de étape	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Points d'essai	Points de réglage	Postes de contrôle / Spécifications de réglage	Procédure de réglage
5	**Réglage du grincement (1) (Lorsqu'un disque de 8 cm est utilisé.)**					
						Remarque : Ce réglage peut être effectué en utilisant un disque de 8 cm, dont les cavités se trouvent dans un diamètre de 75 mm.
						● Régler l'appareil en mode d'essai. (※)
						● Appuyer sur la touche MANUAL SEARCH FWD (▷▷) pour amener le capteur au centre du disque, de façon que la vis d'ajustement du grincement du capteur puisse être vue à travers le trou ovale (un des trous ovales près du moteur à broche) sur la plaque de base du mécanisme d'asservissement.
						● Comme illustré sur la Fig. 7-1, introduire un ⊖ tournevis (moins) par le haut du mécanisme de sorte que la vis de réglage de grincement puisse être tournée.
						● Installe le disque d'essai.
						● Appuyer sur la touche TRACK FWD (▷▷|) et PLAY (▷) en séquence pour allumer le servo de mise au point et le servo d'axe (ne pas tourner le servo d'alignement).
						● Observer la forme d'onde TRK. ERR (erreur d'alignement) à TP1 broche 2 sur un oscilloscope, en insérant un filtre passebas de 4 kHz (voir Fig. 7-2).
	0,5V/div	5msec /div	TP1 Broche 2 (TRK. ERR)	Vis d'ajustement de grincement	Point nul	● Insérer un ⊖ tournevis dans l'orifice du grincement, le tourner et rechercher le point nul (voir Photo 7-1).
				Vis d'ajustement de grincement	Amplitude maximale	● Tourner ensuite lentement le ⊖ tournevis DANS LE SENS CONTRAIRE DES AIGUILLES à partir du point nul jusqu'à ce que la forme d'onde (signal d'erreur d'alignement) atteigne l'amplitude maximale (voir Photo 7-2).
						Remarque : Agir avec précaution car une insertion forcée du ⊖ tournevis provoquera un flottement du capteur vers l'intérieur.
						● Finalement, confirmer qu'il n'y a pas de fluctuation importante dans la tension c-c du signal d'erreur d'alignement (ne pas insérer le filtre passe-bas 4 kHz) quand le capterur est déplacé vers la périphérie intérieure et vers la périphérie extérieure. Si l'on constate une différence supérieure à 10% tourner à nouveau la grincement et regler le signal d'erreur d'alignement au maximum.

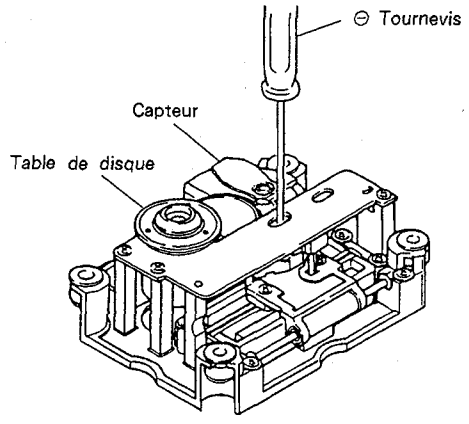


Fig. 7-1

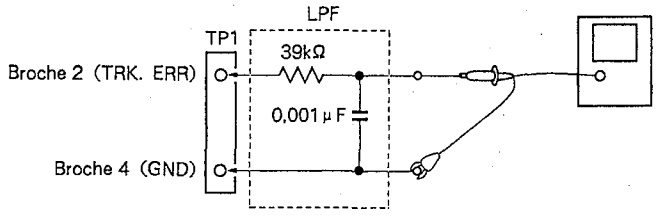


Fig. 7-2

※ : Voir page 43.

N° de étape	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Points d'essai	Points de réglage	Postes de contrôle / Spécifications de réglage	Procédure de réglage
5'	**Réglage du grincement (2) (Lorsqu'aucun disque de 8 cm n'est disponible.)**					

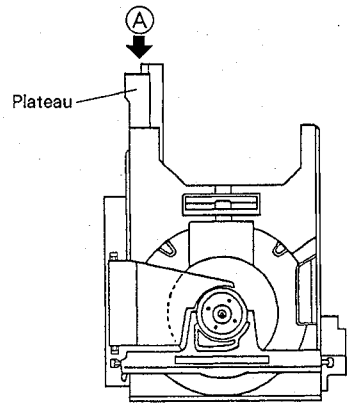


Fig. 7-3

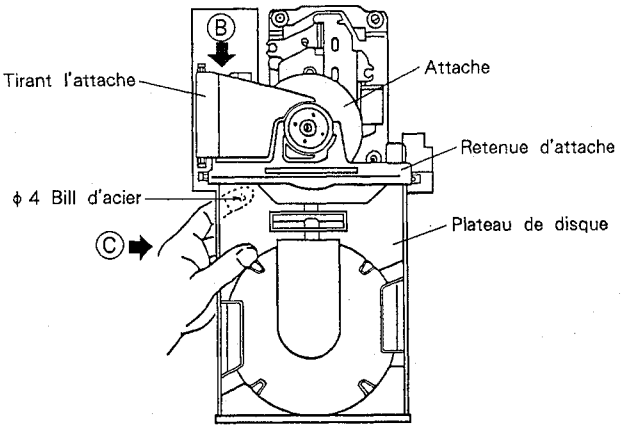


Fig. 7-4

Ce réglage est effectué si aucun disque de 8 cm n'est disponible et que le réglage du grincement (1) ne peut être effectué. Retirer le plateau du disque pour procéder à ce réglage.

● Retrait du plateau du disque

1. Pousser sur le bord arrière à lendroit marquè Ⓐ sur la Fig. 7-3, (＊1) tout en retirant le plateau du disque vers la position oú il tient, comme illustré sur la Fig. 7-4.

(＊1) Lorsqu'on appuie à l'arriér de la crémaillère Ⓐ, le dispositif de maintien du disque est déverrouillé. Une pression prolongée au-delà de l'ouverture complète éjecte le tiroir du disque.

2. Tout en tirant l'attache Ⓑ (voir Fig. 7-4) vers le haut de la main droite, tenir le plateau comme indiqué par Ⓒ de la main gauche et tirer vers l'extérieur. Prendre garde à ne pas laisser tomber les bills d'acier. Il est conseillé de maintenir la bille en place par l'index gauche tout en extrayant le plateau.

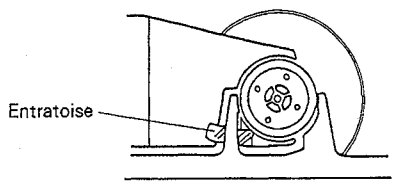


Fig. 7-5

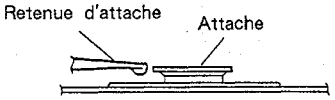


Fig. 7-6

N° de étape	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Points d'essai	Points de réglage	Postes de contrôle / Spécifications de réglage	Prooédure de réglage
						● Placer l'appareil en mode d'essai. (※) ● Appuyer sur la touche MANUAL SEARCH FWD (▷▷) pour amener le capteur au centre du disque, de façon que la vis d'ajustement du grincement du capteur puisse être vue à travers le trou ovale (un des trous ovales près du moteur à broche) sur la plaque de base du mécanisme d'asservissement. ● Comme illustré sur la Fig. 7-7, introduire un ⊖ tournevis (moins) par le haut du mécanisme de sorte que la vis de réglage de grincement puisse être tournée. ● Installer le disque d'essai ; veiller à insérer une entretoise de 3 – 5mm (si aucune entretoise n'est disponible, se servir d'une clé hexagonale) entre l'attache et la retenue d'attache illustré sur la Fig. 7-5. ● Confirmer que l'attache et la retenue ne fasse pas contact l'une sur l'autre (Fig. 7-6). ● Appuyer sur les touches TRACK FWD (▷▷|) et PLAY (▷) en séquence pour fermer les servos de mise au point et d'axe (ne pas fermer le servo d'alignement). ● Installer un filtre passe-bas de coupure à 4 kHz entre l'oscilloscope et TP1 broche 2 (TRK. ERR) et 4 (GND) comme illustré sur la Fig. 7-8 et observer la forme d'onde de TP1 broche 3 (erreur d'alignement) sur l'oscilloscope.
	0,5V/div	5msec /div	TP1 Broche 2 (TRK. ERR)	Vis d'ajustement de grincement Vis d'ajustement de grincement	Point nul Amplitude maximale	● Tourner la vis d'ajustement de grincement à l'aide du ⊖ tournevis pour tuouver le point nul (voir Photo 7-1). ● Tourner ensuite lentement la ⊖ tournevis DANS LE SENS CONTRAIRE DES AIGUILLES du point nul et régler au point où la forme d'onde (signal d'erreur d'alignement) arrive à son amplitude maximale (voir Photo 7-2). Remarque : Eviter d'appuyer sur le ⊖ tournevis pendant le réglage de la vis, car ceci dépacerait le capteur vers l'intérieur, rendant l'ajustement plus difficile. ● En dernier lieu, retirer le filtre passe-bas et confirmer que la tension p-p du signal d'erreur d'alignement (ne pas insérer le filtre passe-bas 4 kHz) ne varie par fortement quand le capteur est déplacé à la première et à la dernière plage du disque. Si les neveaux divergent de 10 % ou davantage, ré-ajuster le point d'amplitude d'erreur maximale en tournant sur la vis d'ajustement.

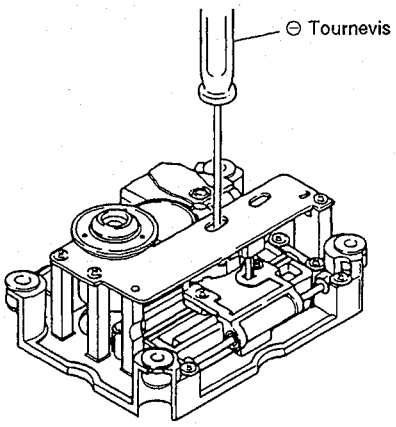


Fig. 7-7

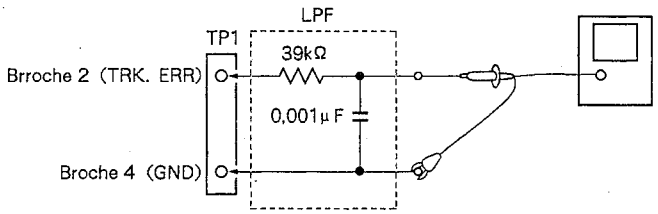


Fig. 7-8

※ : Voir page 43.

N°. de étape	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Points d'essai	Points de réglage	Postes de contrôle / Spécifications de réglage	Procédure de réglage

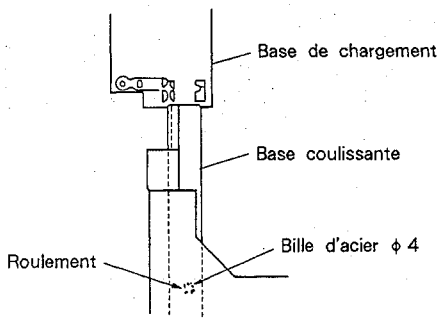


Fig. 7-9

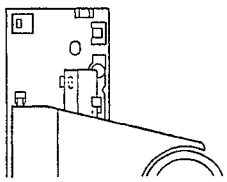


Fig. 7-10

Remonter le plateau du disque selon la procédure ci-après après avoir terminé l'ajustement de grincement.

1. Retirer le disque et l'entretoise.
2. Tout en levant l'attache (marquée par Ⓑ sur la Fig. 7-4) de la main droite, tenir le plateau de la main droite comme illustré par Ⓒ et déplacer la base coulissante dans les armatures en résine dure sur la base de chargement, comme indiqué sur la Fig. 7-9 pour ré-insérer le plateau du disque.
   A ce moment, prendre soin de tenir la bille d'acier en place par l'index de la main droite. Veiller également que le panneau avant ne soit pas endommagé par le roulement (dans la base coulissante), entrant en contact avec le panneau.
3. Insérer la base coulissante de sorte qu'elle s'engage dans les armatures en résine dure à l'arrière de la base de cahrgement (voir Fig. 7-10).
4. Insére à ferme le plateau.

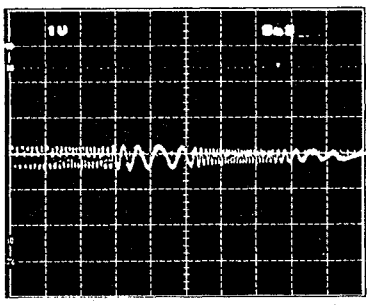


Photo 7-1
Point nul

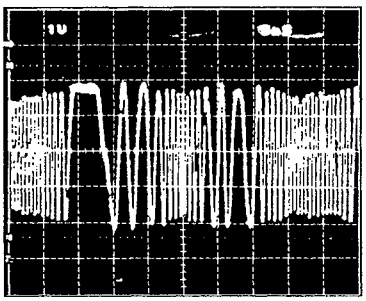


Photo 7-2
Amplitude maximale

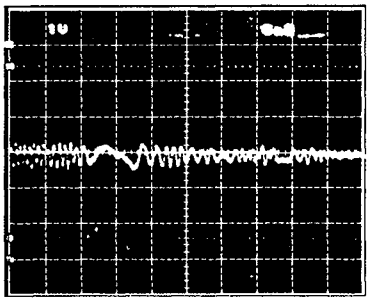
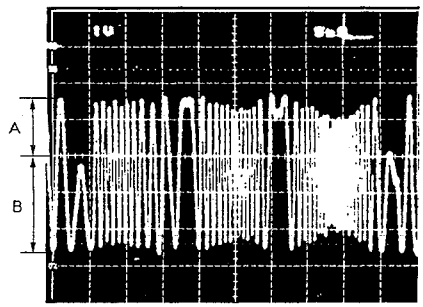


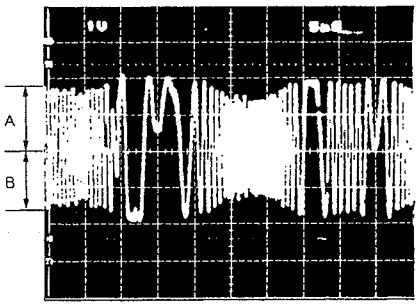
Photo 7-3
Ceci n'est pas la forme d'onde du point nul

N° de étape	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Points d'essai	Points de réglage	Postes de contrôle / Spécifications de réglage	Procédure de réglage
6	**Réglage d'équilibre d'alignement**					
	0,5V/div	5msec /div	TP1 Broche 2 (TRK. ERR)	VR5 (TRK. BAL)		● Installer le disque d'essai. ● Régler l'appareil en mode d'essai. (※) ● Appuyer sur la touche MANUAL SEARCH FWD (▷▷) pour amener le capteur prés du centre du disque. ● Appuyer sur les touches TRACK FWD (▷▷|) et PLAY (▷) en séquence pour faire tourner le disque. ● Observer TP1 broche 2 TRK. ERR (erreur d'alignement) sur l'oscilloscope et regler VR5 TRK. BAL (équilibrage d'alignement) pour éliminer les éléments DC du signal d'erreur d'alignement.



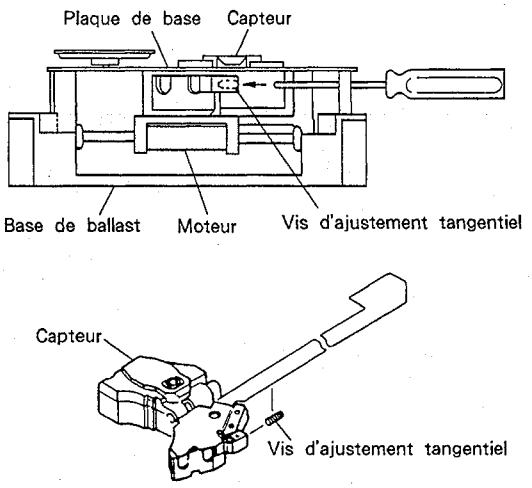
A ≠ B

Photo 7-4 Eléments DC mêlés au signal



A = B

Photo 7-5 Eléments DC éliminés

7	**Réglage tangentiel**	
	 Fig. 7-11	● Régler l'appareil en mode d'essai. (※) ● Ouvrir le plateau et installer le disque d'essai. ● Appuyer sur la touche MANUAL SEARCH FWD (▷▷) pour amener le capteur vers le centre du disque. ● Insérer une clé hexagonale par l'orifice de la vis d'ajustement tangentiel par l'arrière du mécanisme. ● Refermer le plateau. Remarque : Ne pas se servir d'une clé hexagonale en L, mais une comme illustré sur la gauche. L'emploi d'une clé hexagonale en L pourrait relâcher le plateau [voir page 47 5'. Réglage du grincement (2).] ● Appuyer sur les touches TRACK FWD (▷▷|) et PLAY (▷) en séquence pour fermer les servos (le témoin PAUSE s'allume).

※ : Voir page 43.

N° de étape	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Points d'essai	Points de réglage	Postes de contrôle / Spécifications de réglage	Procédure de réglage
		200nsec / div	TP1 Broche 1 Sortie RF	Vis d'ajustement tangentiel	Mire la plus nette possible	● Observer TP1 broche 1 (sortie RF) sur l'oscilloscope et agir sur la vis d'ajustement tangentiel pour obtenir la mire la plus nette possible. ● Le point où la vis d'ajustement doit être amenée se trouve environ à mi-course entre les points où la mire est la plus floue guand la vis est tournée à fond dans le sens des aiguilles et dans le sens contraire. Quand toute la forme d'onde devient claire, se concentrer sur la netteté des lignes fines, formant un losange au centre de la mire (voir Photo 7-8). Régler jusqu'à ce que les lignes fines sur les quatre côtés du losange soient bien définies et denses, comme illustré sur la Photo 7-6. Remarque : Se servir d'une clé hexagonale pour lever légérement le capteur pendant cet ajustement.

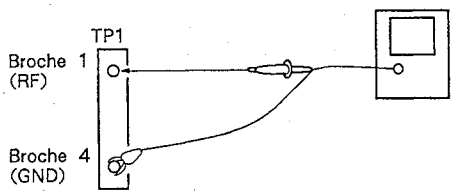


Fig. 7-12

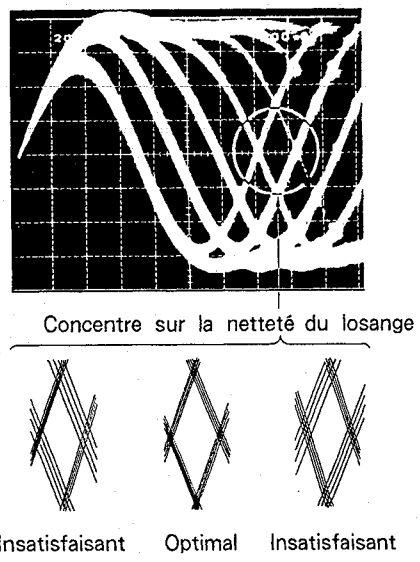
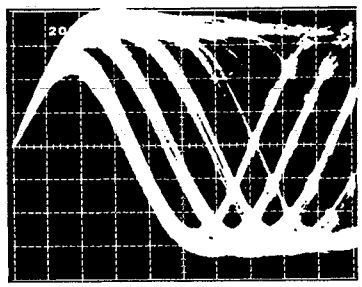


Photo 7-6



Phtot 7-7

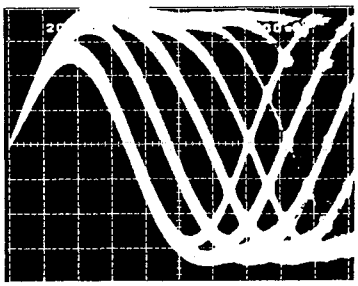


Photo 7-8

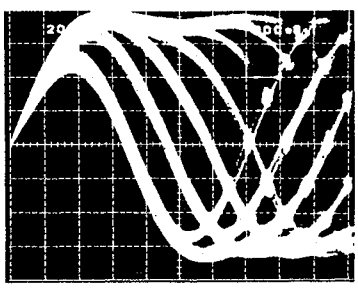


Photo 7-9

N° de étape	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Points d'essai	Points de réglage	Postes de contrôle / Spécifications de réglage	Procédure de réglage
8	**Réglage radial**					
			TP1 Broche 1 (Sortie RF)	Vis d'ajustement radial	Mire la plus nette possible	Remonter le plateau du disque selon la procédure ci-après après avoir terminé l'ajustement de grincement. Remarque : Se reporter à la page 47, 5'. Réglage du grincement (2) au sujet du retrait du plateau du disque. ● Installer le disque d'essai. ● Placer l'appareil en mode d'essai. (※) ● Appuyer sur les touche MANUAL SEARCH FWD (▷▷) pour amener le capteur au centre du disque, de façon que la vis d'ajustement tangentiel puisse être vue d'en haut (voir Fig. 7-11). ● Appuyer sur les touches TRACK FWD (▷▷|) et PLAY (▷) en séquence pour fermer les servos (le témoin PAUSE s'allume). ● Observer TP1 broche 1 (sortie RF) sur l'oscilloscope et agir sur la vis d'ajustement radial pour obtenir la mire la plus nette possible. ● Quand toute la forme d'onde devient claire, se concentre sur la netteté des lignes fines, formant un losange au centre de la mire (voir Photo 7-8). Régler jusqu'à ce que les lignes fines sur les quatre côtés du losange soient bien définies et denses, comme illustré sur la Photo 7-6. ● Procéder deux fois ou plus à l'ajustement tangentiel et à l'ajustement radial alternativement. ● Lorsque l'ajustement est terminé, replacer le plateau du disque (voir page 49).

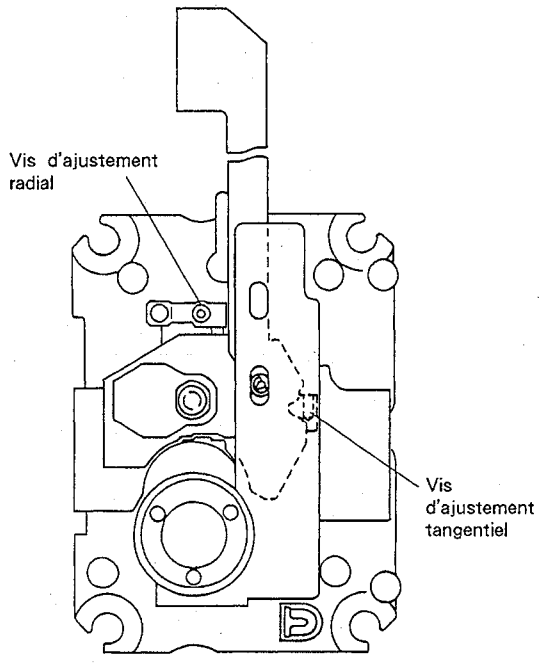


Fig. 7-13

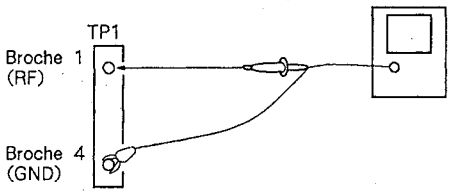


Fig. 7-14

※ : Voir page 43.

N° de étape	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Points d'essai	Points de réglage	Postes de contrôle / Spécifications de réglage	Procédure de réglage
9	**Réglage de gain de mise au point**					
						● L'alimentation étant coupée (POWER OFF), raccorder l'oscillateur comme illustré sur la Fig. 7-13. ● Régler l'appareil en mode de lecture normale. ● Mettre l'oscillateur sous tension (ON) et le régler pour fournir un signal de 1,2kHz 1Vp-p. Remarque : Certains oscillateurs déchargent une tension DC lors de leur mise sous tension. Par conséquent, il est conseillé de connecteur l'oscillateur aprés l'avoir mis sous tension.
	20mV/div CH1 (X) 5mV/div CH2 (Y) (sonde 10 : 1)	Axe des X : TP1 Broche 5 (FCS. IN) Axe des Y : TP1 Broche 6 (FCS. ERR)	VR3 (FCS. GAN)	Différence de phase de 90°		● Ajust VR3 FCS. GAN (gain de mise au point) de sorte que la figure de Lissajou devienne un cercle horizontal (différence de phase de 90°).

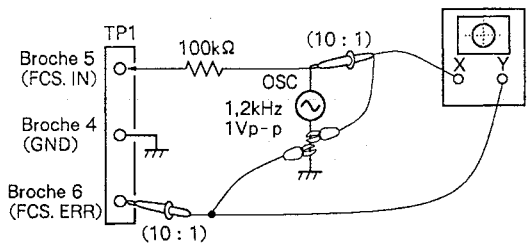


Fig. 7-13

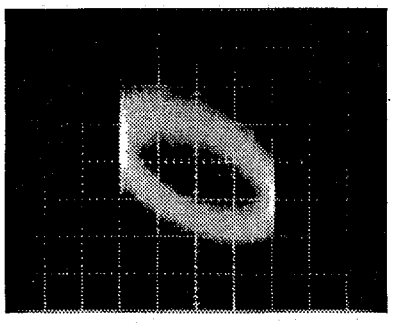


Photo 7-10
Gain sur-compensé

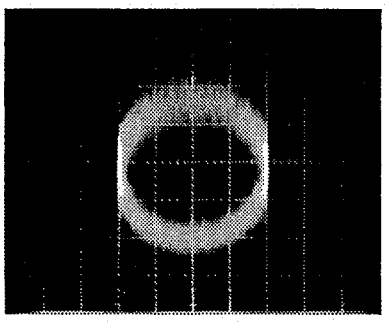


Photo 7-11
Gain optimal

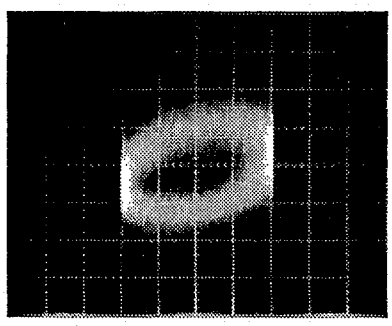


Photo 7-12
Gain sous-compensé

N° de étape	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Points d'essai	Points de réglage	Postes de contrôle / Spécifications de réglage	Procédure de réglage
10	**Réglage de gain d'alignement**					
	50mV/div CH1 (X) 5mV/div CH2 (Y) (sonde 10 : 1)		Axe des X : TP1 Broche 3 (TRK. IN) Axe des Y : TP1 Broche 2 (TRK. ERR)	VR3 (TRK. GAN)	Difference de phase de 90°	● L'alimentation étant coupée (POWER OFF), raccorder l'oscillateur comme illustré sur la Fig. 7-14. ● Régler l'appareil en mode de lecture normale. ● Mettre l'oscillateur sous tension (ON) et le régler pour fournir un signal de 1,2kHz 2Vp-p. Remarque : Certains oscillateurs déchargent une tension DC lors de leur mise sous tension. Par consequent, il est conseillé de connecter l'oscillateur aprés l'avoir mis sus tension. ● Ajuster VR4 TRK. GAN (gain d'alignement) de sorte que la figure de Lissajou devienne un cercle horizontal (différence de phase de 90°)

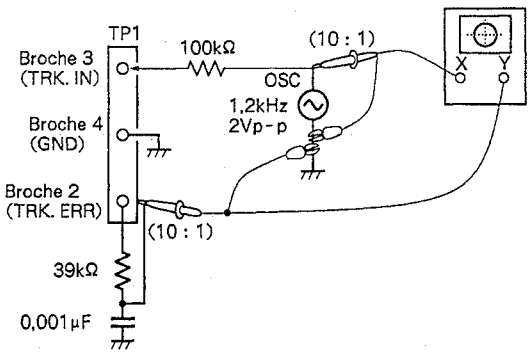


Fig. 7-14

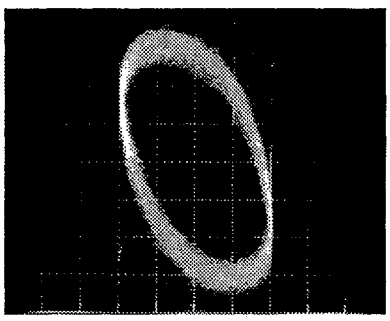


Photo 7-13
Gain sur-compensé

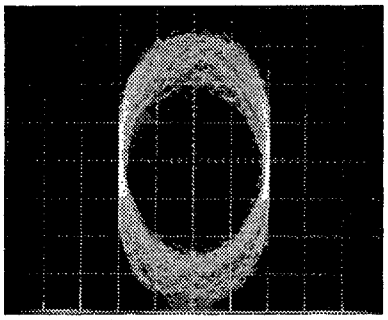


Photo 7-14
Gain optimal

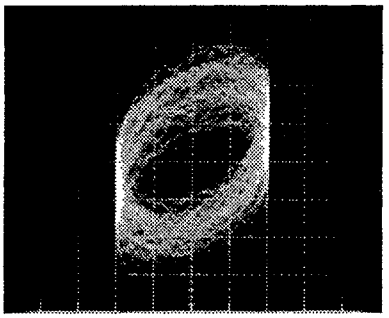
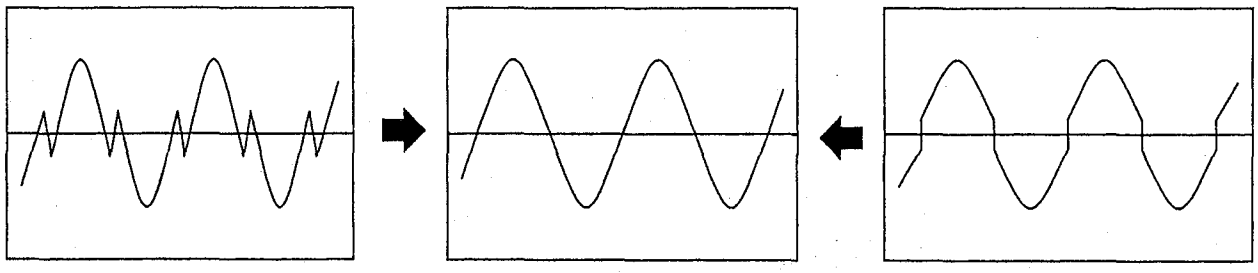


Photo 7-15
Gain sous-compensé

N° de étape	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Points d'essai	Points de réglage	Postes de contrôle / Spécifications de réglage	Procédure de réglage
11	**Réglage de fréquence libre VCO**					
			TP2 Broche 2 (PLCK)	VR8 (VCO. ADJ)	4,275 ± 0,025MHz	● Régler l'appareil en mode d'essai. (※) ● Court-circuiter l'ensemble et le cavalier de masse (GND) à l'aide d'un ⊖ tournevis ou d'un outil analogue. (※) ● Raccorder un fréquencemètre, capable de mesurer des fréquences de 10MHz et audelà, sur TP2 broche 2 (PLCK). ● Ajuster VR8 (ajustement VCO) de sorte que la lecture du fréquencemètre devienne 4,275 ± 0,025MHz.
12	**Méthode de confirmation du caractère S (erreur de mise au point)**					
			TP1 Broche 6 (FCS. ERR)			● Régler l'appareil en mode d'essai. (※) ● Mettre TP1 broche 5 FCS. IN (gain de mise au point) à la masse (GND). ● Observer la sortie de forme d'onde à TP1 broche 6 FCS. ERR (erreur de mise au point) quand la TRACK FWD (▷▷|) est actionnée.
13	**Réglage de MSB**					
	5mV/div	0.2msec /div	JA1 Borne LINE OUTPUT (canal gauche)	VR9	Onde sinusoidale	● Réglaer l'appareil en mode de lecture normale. ● Reproduire la piste 20 (− 60dB, 1kHz, canal gauche, canal droit du disque d'essai YEDS-7). Raccorder l'oscilloscope au canal gauche de la borne LINE OUTPUT (JA1) et observer la forme d'onde de la sortie audio. ● Ajuster VR9 MSB (canal gauche) de sorte que l'onde sinusoidale apparaisse surr l'oscilloscope. ● Ajuster VR10 (canal droit) de la même manière.
			JA1 Borne LINE OUTPUT (canal droit)	VR10	Onde sinusoidale	

● Forme d'onde de la distorsion de croisement źero



NG　　OK　　NG

※ : Voir page 43.

7. AJUSTE

A continuación se of recen los ajustes para esta unidad. Estos ajustes deberán realizarse en el orden indicado.

● Ajustes e itemes de comprobación

1. Ajuste de la desviación de seguimiento, enfoque y RF.
2. Ajuste del nivel de RF
3. Comprobación de la energía del diodo lasér (LD)
4. Comprobación de la sincronización del enfoque y del eje
5. Ajuste de retícula
6. Ajuste del equilibrio de seguimiento
7. Ajuste tangencial
8. Ajuste radial
9. Ajuste de la ganancia de enfoque
10. Ajuste de la ganancia de seguimiento
11. Ajuste de la frecuencia de oscilación libre del oscilador controlade por tensión (VCO)
12. Método para confirmar el carácter S (error de enfoque)
13. Ajuste de MSB

● Equipos de medición

1. Osciloscopio de doble traza
2. Medidor de enería óptica
3. Disco de prueba (YEDS-7), disco de 8 cm
4. Filtro de ajuste de ganancia de bucle
5. Generador de seùales
6. Frecuencímetro
7. Otros equipos de medición regulares

● Modo de prueba

Activación y desactivación del mode de prueba

① Para activar el mode de prueba, ponga en ON el interruptor de alimentación (S501) con el interruptor de modo de prueba (S1) en ON.

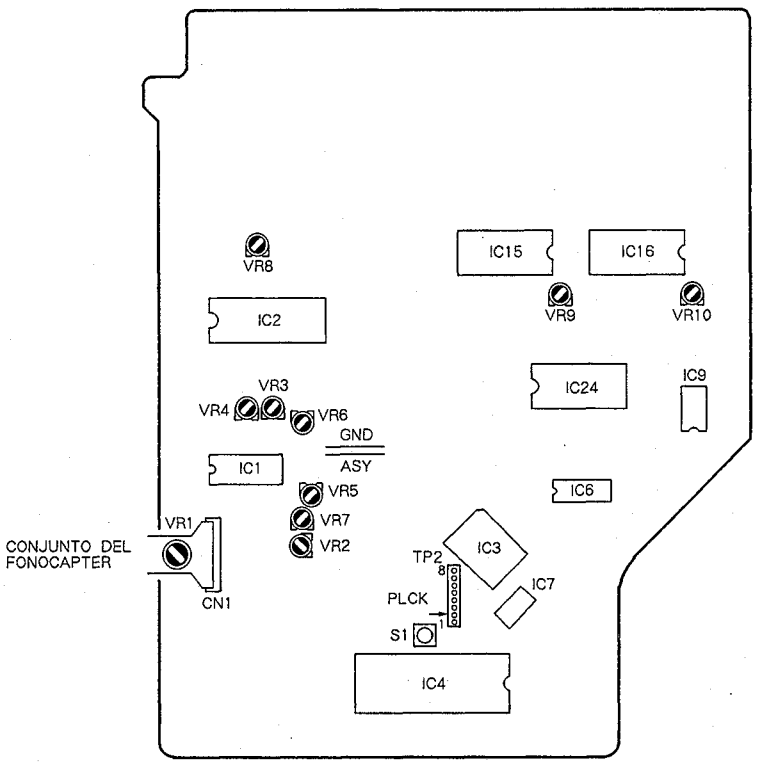
② El modo de prueba se desactivará poniendo el interruptor de alimentación en OFF.

Las funciónes de las teclas en el modo de prueba se describen en la tabla 7-1.

● Tores variables (VR) de ajuste y sus nombres

VR1 : Alimentación de lasér
VR2 : Desviación de RF (RF. OFS)
VR3 : Ganancia de enfoque (FCS. GAN)
VR4 : Ganancia de seguimiento (TRK. GAN)
VR5 : Equilibrio de seguimiento (TRK. BAL)
VR6 : Desviación de enfoque (FCS. OFS)
VR7 : Desviación de seguimiento (TRK. OFS)
VR8 : Ajuste del VCO (VCO. ADJ)
VR9,VR10 : Ajuste MSB

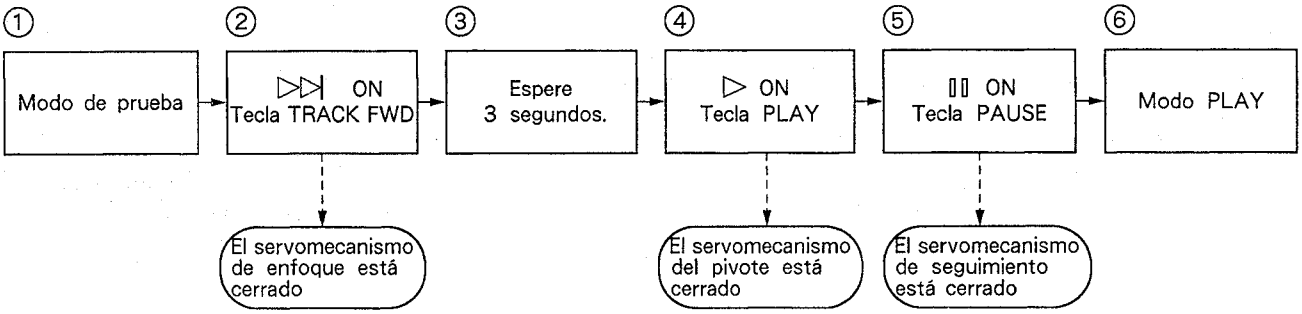
Punto de ajuste



En el modo de prueba, los servos deberán abrir y cerrarse individualmente. Por consiguiente, los servos deberán cerrarse en la secuencia apropiada (secuencia en serie) a fin de poner la máquina en el modo de reproducción. Tenga en cuenta además que la máquina no entrará en el modo de reproducción cuando haya presionado la tecla PAUSE (▯▯).

Por ejemplo, para cambiar del modo de parada al de reproducción, tendrá que presionar las teclas de función en el orden siguiente :

* En el modo de prueba, los servos deberán operarse en secuencia en serie.



• Funciónes de las teclas en el modo de prueba

Símbolo	Nombre de la tecla	Función en el modo de prueba	Descripción
▷▷|	TRACK FWD	Cierre del servo de enfoque	Activa el diodo lasér, y eleva y hace descender el actuador de enfoque para cerrar el servo de enfoque.
▷	PLAY	Cierre del servo del eje	Cierra el servo en el modo CLV-A después de impulsar el motor del eje.
▯▯	PAUSE	Cierre/apertura del servo de seguimiento	Actúa como conmutador : cierra el servo de seguimiento y activa el modo de reproducción cuando se presiona (suponiendo que los servos de enfoque y del eje estén cerrados), momento en el que se encenderá el indicador PAUSE ; y abre el servo de seguimiento cuando vuelve a presionarse.
◁◁	MANUAL SEARCH REV	Retroceso del carro (se mueve hacia adentro)	Mueve el carro rápidamente (3 cm/s) hacia la pista más interior. Tenga cuidado para no moverlo demesiado ya que no hay dispositivo de seguridad para detener el carro.
▷▷	MANUAL SEARCH FWD	Avance del carro (mueve el carro hacia afuera)	Mueve el carro rápidamente (3 cm/s) hacia la pista más exterior. Tenga cuidado para no moverlo demasiado ya que no hay dispositivo de seguridad para detener el carro.
□	STOP	Parada	Para todos los servos y devuelve el sistema a su estado inicial.
⏏	OPEN/CLOSE	Apertura/cierre de la bandeja del disco	Abre cierra la bandeja del disco. Sin embargo, el captor no regresa a su soporte en OPEN (apertura), y permanece estacionario en CLOSE (cierre).

Tabla 7-1

N° de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Itemes de comprobación/ Especificaciones de ajuste	Procedimiento de ajuste
1	**Ajuste de la desviación de seguimiento, enfoque y RF**					
			TP1 Patilla 2 (TRK. ERR)	VR5 (TRK. BAL)	Desviación de seguimiento 45 é	● Ponga la unidad en el modo de prueba. (※) ● Ponga VR5 TRK. BAL (equilibrio de seguimiento) en una posición aproximadamente 45 é a la izquierda del centro*.
				VR7 (TRK. OFS)	0V ± 50mV	● Ajuste VR7 TRK. OFS (desviación de seguimiento) de forma que la TRKG. ERR (tensión de error) de seguimiento de la patilla 2 de TP1 sea de 0V ± 50mV.
			TP1 Patilla 6 (FCS. ERR)	VR6 (FCS. OFS)	Desviación de enfoque 0V ± 50mV	● Ajuste VR6 FCS. OFS (desviación de enfoque) de forma que la tensión de FOCS. ERR (error de enfoque) en pa patilla 6 de TP1 sea de 100mV ± 50mV.
			TP1 Patilla 1 (RF OUTPUT)	VR2 (RF. OFS)	Desviación de RF 100mV ± 50mV	● Ajuste VR2 RF. OFS (desviación de RF) de forma que la tension de salida de RF de la patilla de TP1 sea de 100mV ± 50mV. Nota : Cuando ajuste la desviación de seguimiento, realice siempre "6. Ajuste del equilibrio de seguimiento".
2	**Ajuste del nivel de RF**					
			TP1 Patilla 1 (RF OUTPUT)	VR1 (Alimentación de láser)	1,5Vp-p $^{+0,2V}_{-0V}$	● Ponga la unidad en el modo de prueba. (※) ● Conecte el osciloscopio a la patilla 1 de TP1 (salida de RF), ponga en reproducción el disco de prueba, y mida la tensión de pico a pico de la forma de onda de RF. ● Ajuste VR1 (alimentación de láser) de forma que la tensión sea 1,5Vp-p $^{+0,2V}_{-0V}$.
3	**Comprobación de la energía del diodo lasér (LD)**					
					Menos de : 0,13mW	● Ponga la unidad en el modo de prueba. (※) ● Presione la tecla TRACK FWD (▷▷|) para activar el diodo lasér (LD). ● Coloque el modidor de potencia óptico directamente encima del objetivo y confirme que la potencia LD sea menos de 0,13mW.
4	**Comprobación de la sincronización del enfoque y del eje**					
	0,5V/div	100msec /div	TP1 Patilla 1 (Salida de RF)		La seùal de RF sale Giro en sentido de avance (hacia la derecha)	● Instale el disco de prueba. ● Ponga la unidad en el modo de prueba. (※) ● Presione la tecla MANUAL SEARCH FWD (▷▷) para mover el captor hasta el centro del disco. ● Observe la salida de la patilla 1 de TP1 (salida de RF) en el osciloscopio. Compruebe si la seùal de RF sale después de presionar la tecla TRACK FWD (▷▷|). ● Presione la tecla PLAY (▷) y compruebe si el disco gira a velocidad constante (aprox. 300 rpm cerca del centro del disco) en sentido de avance (hacia la derecha) ; el disco puede no girar o hacerlo hacia la izquierda.

※ : Consulte la página 56.

N° de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Itemes de comprobación/ Especificaciones de ajuste	Procedimiento de ajuste
5	**Ajuste de retícula (1) (Cuando emplee un disco de 8 cm.)**					
						Nota : Este ajuste podrá realizarse empleando un disco de 8 cm que posea los hoyos dentro de un diámetro de 75 mm. ● Ponga la unidad en el modo de prueba. (※) ● Presione la tecla MANUAL SEARCH FWD (▷▷) para mover el captor hasta el centro del disco, de forma que el tornillo de ajuste de reticula de dicho captor pueda verse a través del orificio ovalado (uno de los orificios ovalados que está cerca del motor del eje central) de la placa base del servomecanismo. ● Como se muestra en la Fig. 7-1, inserte un ⊖ destornillador (ranurado) desde la parte superior del mecanismo y compruebe si puede girar el tornillo de ajuste de reticula. ● Instale el disco de prueba. ● Presione secuencialmente las teclas TRACK FWD (▷▷|) y PLAY (▷) para cerrar los servos de enfoque y del eje (no cierre el servo de seguimiento). ● Observe la forma de onda de TRK. ERR (error de seguimiento) de la patilla 2 de TP1 en el osciloscopio, insertando un filtro de paso bajo de 4 kHz (consulte la Fig. 7-2).
	0,5V/div	5msec /div	TP1 Patilla 2 (TRK. ERR)	Tornillo de ajuste de retícula Tornillo de ajuste de retícula	Punto nulo Amplitud máxima	● Inserte un ⊖ destornillador en el orificio del tornillo de ajuste de retícula, gire y halle el punto nulo (consulte la foto 7-1). ● A continuación, gire lentamente ⊖ destornillador HACIA LA IZQUIERDA desde el punto nulo hasta que la forma de onda (seùal de error de seguimiento) alcance la máxima amplitud (consulte la foto 7-2). Nota : Tenga cuidado, porque si inserta el destornillador a la fuerza, la unidad captora se elevará. ● Por último, confirme que no haya gran fluctuación la tensión de pico a pico de la seùal de error de seguimiento (no inserte el filtro de paso bajo de 4 kHz de corte) cuando el captor se desplace de la pista más interior a la más exterior del disco. Si la diferencia es mayor del 10 % o más, vuelva a girar el tornillo de ajuste de retícula y ajuste la señal de error al máximo.

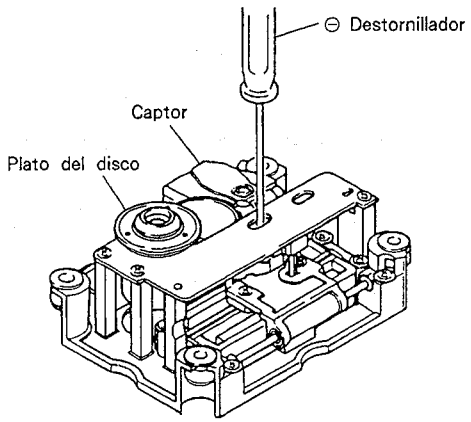


Fig. 7-1

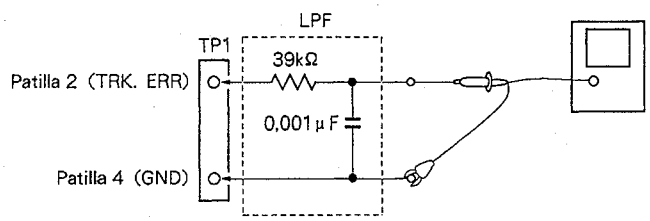


Fig. 7-2

※ : Consulte la página 56.

N° de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Itemes de comprobación/ Especificaciones de ajuste	Procedimiento de ajuste
5'	**Ajuste de retícula (2) (Cuando no disponga de disco de 8 cm.)**					

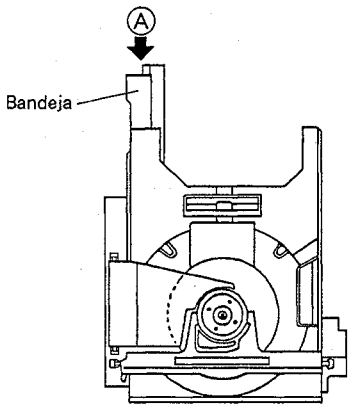


Fig. 7-3

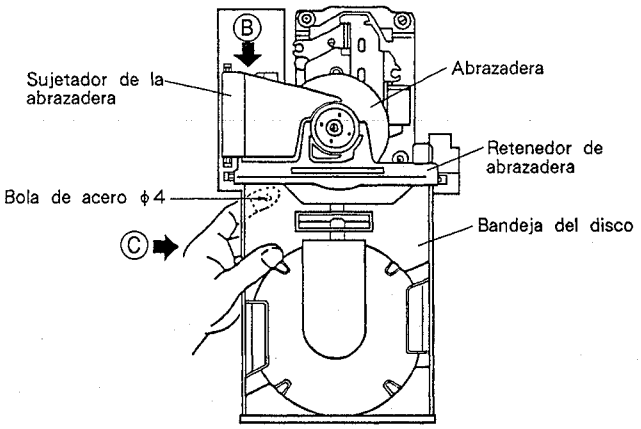


Fig. 7-4

Este ajuste se realiza cuando no haya disco de 8 cm disponible, y el ajuste de retícula (1) no pueda realizarse. Para realizar este ajuste, extraiga la bandeja del disco.

● Extracción de la bandeja del disco.

1. Presione el borde posterior del bastidor, marcado con Ⓐ en la Fig. 7-3, (＊1) tirando de la bandeja del disco hasta la posición en la que agarre, mostrada en la Fig. 7-4.

(＊1) Si presiona el borde posterior del bastidor Ⓐ, se libera la abrazdera de discos. Si continua presionando después de que se haya liberado completamenta la abrazadera, sale eyectada la bandeja del discos.

2. Tirando del soporte de abrazadera Ⓑ (consulte la Fig. 7-4) hacia arriba con la mano derecha, suje te la bandeja como se indica en Ⓒ con la mano izquierda y tire de ella hacia afuera. Tenga cuidado para que no caiga la bola de acero ϕ4 (recomendamos sujetar la bola en su lugar con el dedo indice de la mano izquierda al sacar la bandeja).

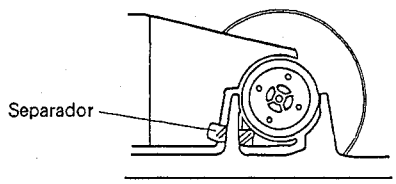


Fig. 7-5

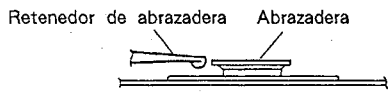


Fig. 7-6

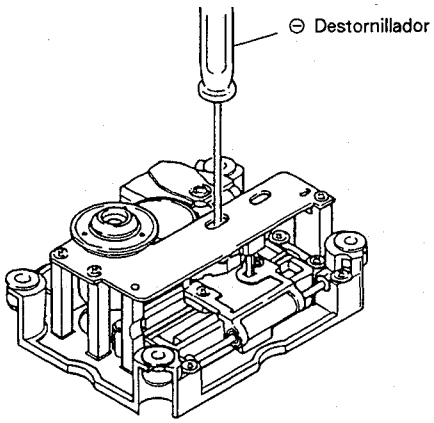
<table>
<tr><th rowspan="2">N° de paso</th><th colspan="2">Ajuste del osciloscopio</th><th rowspan="2">Puntos de prueba</th><th rowspan="2">Puntos de ajuste</th><th rowspan="2">Itemes de comprobación/ Especificaciones de ajuste</th><th rowspan="2">Procedimiento de ajuste</th></tr>
<tr><th>V</th><th>H</th></tr>
<tr><td></td><td colspan="5"> 

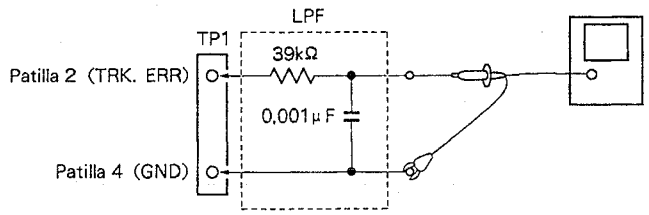
Fig. 7-7


Fig. 7-8</td><td>● Ponga la unidad en el modo de prueba. (※)
● Presione la tecla MANUAL SEARCH FWD (▷▷) para mover el captor hasta el centro del disco, de forma que el tornillo de ajuste de retícula de dicho captor pueda verse a través del crificio ovalado (uno de los orificios ovalados que está cerca del motor del eje central) de la placa base del servomecanismo.
● Como se muestra en la Fig. 7-7, inserte un ⊖ destornillador (ranurado) desde la parte superior del mecanismo y compruebe si puede girar el tornillo de ajuste de retícula.
● Instale el disco de prueba, aseúrese de insertar un separador de 3 – 5 mm (si no dispone de separador emplee una llave haxagonal) entre el sujetador de abrazadera y el retenedor de abrazadera, como se muestra en la Fig. 7-5.
● Confirme que la abrazadera y el retenedor de la misma no estén en contacto entre si (Fig. 7-6).
● Presione secuencialmente las teclas TRACK FWD (▷▷|) y PLAY (▷) para cerrar los servos de enfoque y del eje (no cierre el servo de seguimiento).
● Inserte un filtro de paso bajo de 4 kHz de corte entre el osciloscopio y la patilla 3 (TRK. ERR) y 5 (GND) de TP1, como se muestra en la Fig. 7-8, y observe la forma de onda de la patilla 3 de TP1 (error de seguimiento) en el osciloscopio.</td></tr>
<tr><td></td><td>0,5V/div</td><td>5msec /div</td><td>TP1
Patilla 2
(TRK. ERR)</td><td>Tornillo de ajuste de retícula

Tornillo de ajuste de retícula</td><td>Punto nulo

Amplitud máxima</td><td>● Gire el tornillo de ajuste de reticula con el destornillador hasta encontrar el punto nulo (consulte la foto 7-1).
● A continuación, gire lentamente el ⊖ destornillador HACIA LA IZQUIERDA de punto null y ajùstelo hasta el punto en el que la forma de onda (seùal de error de seguimiento) llegue por primera vez a su máxima amplitud (consulte la foto 7-2).

Nota : Evite aplicar excesiva presión al ⊖ destornillador cuando ajuste el tomillo. De lo contrario, el captor se moverá hacia adentro haciendo más dificil el ajuste.

● Por último, desconecte el filtro de paso bajo y confirme que la tensión de pico a pico de la seùal de error de seguimiento (no inserte el filtro de paso bajo de 4 kHz de corte) no varie mucho cuando el captor se mueva de la pista más interior a la más exterior del disco. Si los niveles diferen en un 10 % o más, reajuste el punto de error de amplitud máxima girando el tornillo de ajuste de retí cula.</td></tr>
</table>

※ : Consulte la página 56.

N° de étape	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Points d'essai	Points de réglage	Postes de contrôle / Spécifications de réglage	Procédure de réglage

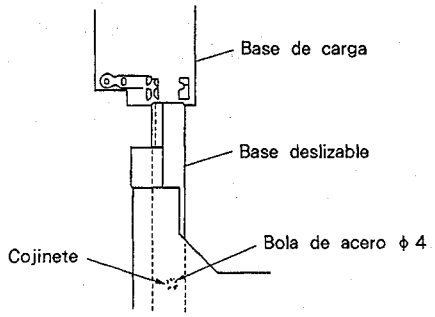


Fig. 7-9

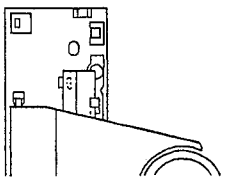


Fig. 7-10

Una vez finalizado el ajuste de retícula, vuelva a montar la bandeja del disco de acuerdo con el procedimiento siguiente.

1. Extraiga el disco y el separador.
2. Levantando el sujetador de abrazadera (marcado con Ⓑ en la Fig. 7-4) con la mano izquierda, sujete la bandeja con la mano izquierda como se indica en Ⓒ y deslica la base deslizable en los acopladores de resina rigida de la base de carga como se muestra en la Fig. 7-9 para reinsertar la bandeja del disco.
   En este momento, asegûrese de sujetar la bola de acero en su lugar con el dedo indice de la mano izquierda. Además, tenga cuidado para no dañar el panel frontal con la base deslizable y el cojinete de boals de acero (de la base deslizable).
3. Inserte la base deslizable de forma que encaje en los dos acopladores de resina rigida de la parte posterior de la base de carga (consulte la Fig. 7-10).
4. Inserte completamente la bandeja del disco.

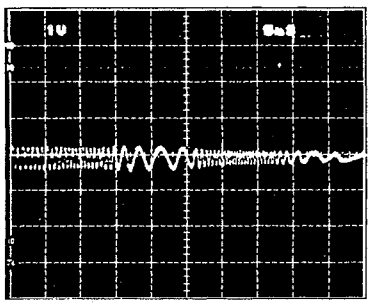


Foto 7-1
Punto cero

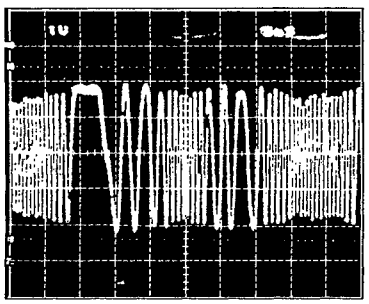


Foto 7-2
Amplitud máxima

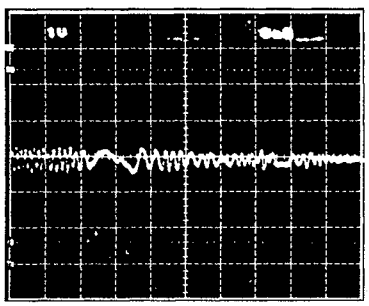
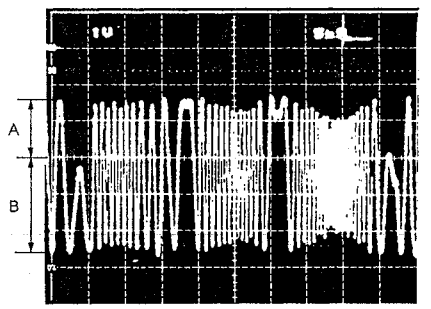


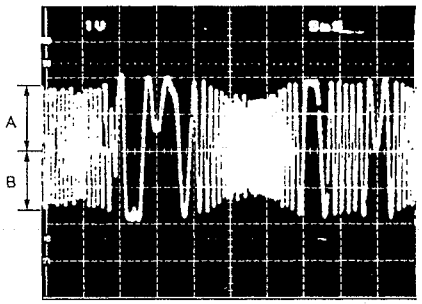
Foto 7-3
Forma de onda de un punto no cero

N° de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Itemes de comprobación/ Especificaciones de ajuste	Procedimiento de ajuste
6	**Ajuste del equilibrio de seguimiento**					
	0,5V/div	5msec /div	TP1 Patilla 2 (TRK. ERR)	VR5 (TRK. BAL)		● Instale el disco de prueba. ● Ponga la unidad en el modo de prueba. (※) ● Presione la tecla MANUAL SEARCH FWD (▷▷) para colocar el captor cerca del centro del disco. ● Presione secuencialmente las teclas TRACK FWD (▷▷|) y PLAY (▷) para hacer que el disco gire. ● Observe la forma de onda (error de seguimiento) de la patilla 2 (TRK. ERR) de TP1 en el osciloscopio, y ajuste VR5 TRK. BAL (equilibrio de seguimiento) para eliminar los elementos de CC de la señal de error de seguimiento.
7	**Ajuste tangencial**					



A ≠ B

Foto 7-4 Elementos de CC mezclados conla



A = B

Foto 7-5 Elementos de CC eliminados

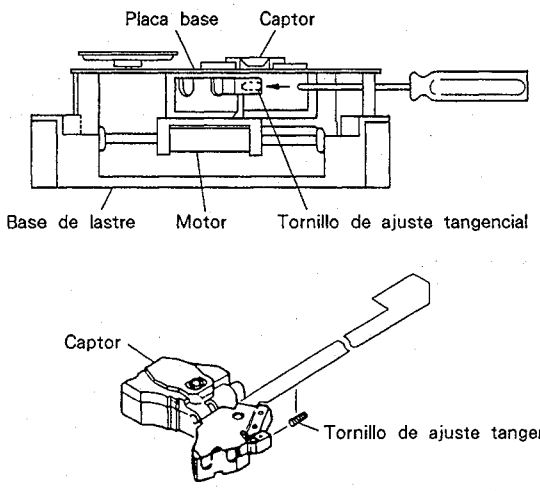


Fig. 7-11

- Ponga la unidad en el modo de prueba. (※)
- Abrir la bandeja y instale el disco prueba.
- Presione la tecla MANUAL SEARCH FWD (▷▷) para colocar el captor cerca del centro del disco.
- Inserte una llave hexagonal en la sección del tornillo de ajuste tangencial desde la parte posterior del mecanismo.
- Cierre la bandeja.

Note : No emplee una llave hexagonal en forma de L Emplee una como la mostrada a la izquierda. Si emplea una llave hexagonal en forma de L Puede hacer que se afloje la bandeja [consulte la página 60 5'. "Ajuste de retícula (2)"].

- Presione secuencialmente las teclas TRACK FWD (▷▷\|) y PLAY (▷) para cerrar los servos (el indicador de PAUSE se encenderá).

※ : Consulte la página 56.

N° de étape	Réglage d'oscilloscope V	Réglage d'oscilloscope H	Points d'essai	Points de réglage	Postes de contrôle / Spécifications deréglage	Procédure de réglage
		200nsec / div	TP1 Patilla 1 Salida de RF	Tornillo de ajuste tangencial	Patrón ocular más nitido posible	● Observe la forma de onda de la patilla 1 de TP1 (salida de RF) en el osciloscopio, y ajuste el tornillo de ajuste tangencial hasta lograr el patrón ocular más nitido posible. ● El punto en el que el tomillo de ajuste tendrá que quedar está aproximadamente en mitad de los puntos en los que el patrón ocular se vuelve más borroso al girar dicho tornillo hacia la derecha y la izquierda. Cuando toda la forma de onda sea clara, concentre o aguce las lineas finas que forman el diamante en el centro del patrón ocular (consulte la foto 7-8). Ajuste hasta que las lineas finas de los cuatro lados del diamante queden nitidamente definidas y densas, como se muestra en la foto 7-6. Nota : Emplee una llave haxagonal para levantar algo en captor cuando realice este ajuste.

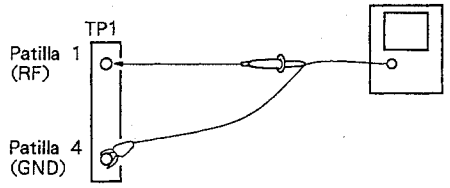


Fig. 7-12

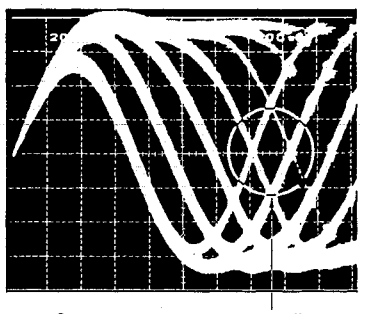


Foto 7-6

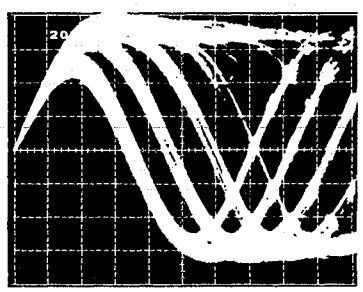


Foto 7-7

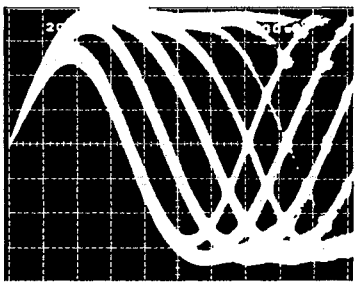


Foto 7-8

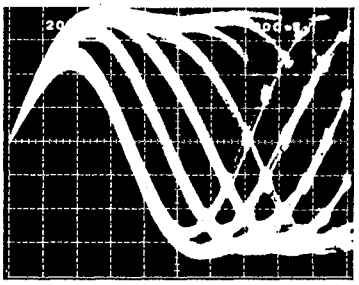


Foto 7-9

N° de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Itemes de comprobación/ Especificaciones de ajuste	Procedimiento de ajuste
8	**Ajuste radial**					
			TP1 Patilla 1 (salida de RF)	Tornillo de ajuste radial	Patrón ocular más nitido posible	Antes de inciar este ajuste, extraiga la bandeja del disco. Nota : Con respecto a la extraccion de la bandeja del disco, consulte la página 60, 5'. Ajuste de retícula (2). ● Instale el disco prueba. ● Ponga la unidad en el modo de prueba. (※) ● Presione la tecla MANUAL SEARCH FWD (▷▷) para mover el captor hasta el centro del disco, de forma que el tornillo de ajuste tangencial pueda verse desde la parte superior (consulte la Fig. 7-11). ● Presione secuencialmente las teclas TRACK FWD (▷▷|) y PLAY (▷) para cerrar los servos (el indicador de PAUSE se encenderá). ● Observe la forma de onda de la patilla 1 de TP1 (salida de RF) en el osciloscopio, y ajuste el tornillo de ajuste radial hasta lograr el patrón ocular más nitido posible. (Fig. 7-13) ● Cuando toda la forma de onda sea clara, concentre o aguce las lineas finas que forman el diamante en el centro del patrón ocular (consulte la foto 7-8). Ajuste hasta que las lineas finas de los cuatro lados del diamante queden nitidamente difinidas y densas, como se muestra en la foto 7-6. ● Realice el ajuste tangencial y el ajuste radial dos o más veces alternativamente. ● Cuando finalice el ajuste, vuelava a instalar la bandeja del disco (consulte la página 62).

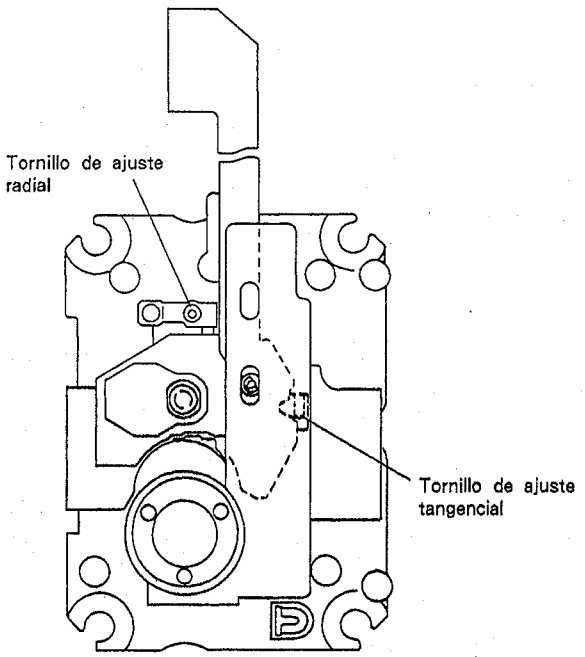


Fig. 7-13

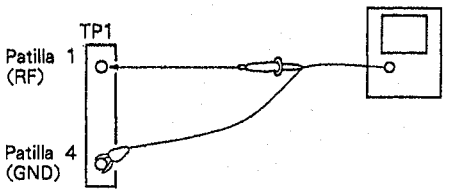


Fig. 7-14

※ : Consulte la página 56.

N° de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Itemes de comprobación/ Especificaciones de ajuste	Procedimiento de ajuste
9	**Ajuste de la ganancia de enfoque**					
	20mV/div CH1 (X) 5mV/div CH2 (Y) (sonda 10 : 1)		Eje X : TP1 Patilla 5 (FCS. IN) Eje Y : TP1 Patilla 6 (FCS. ERR)	VR3 (FCS. GAN)	Diferencia de fase de 90é	● En el estado de POWER OFF (apagado), conecte el osciloscopio y el oscilador como se muestra en la Fig. 7-13. ● Ponga la unidad en el modo de reproducción normal. ● Conecte la alimentación del oscilador y ajuste su salida a una seùal de 1,2kHz, 1Vp-p. Nota : Algunos osciladores descargan una tensión CC cando se conecta su alimentación. Pro lo tanto, se recomenda conectar el oscilador después de haber conectado su alimentación. ● Ajuste VR3 FCS. GAN (ganancia de enfoque) de forma que la figura de Lissajous se convierta en un circulo horizontal (diferencia de fase de 90é).

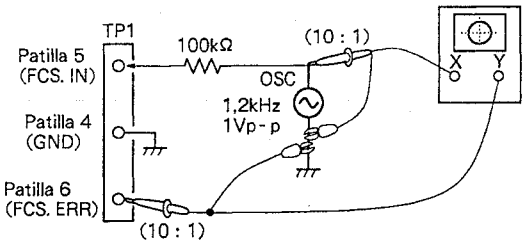


Fig. 7-13

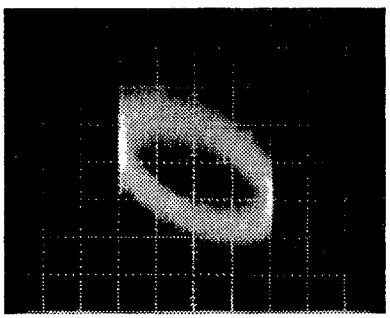


Foto 7-10
Ganancia sobrecompensada

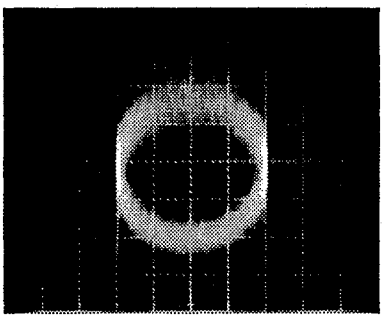


Foto 7-11
Ganancia óptima

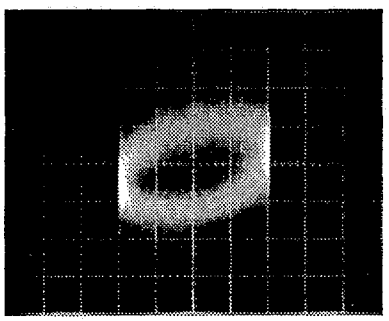


Foto 7-12
Ganancia subcompensade

N° de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Itemes de comprobación/ Especificaciones de ajuste	Procedimiento de ajuste
10	**Ajuste de la ganancia de seguimiento**					
						● En el estado de POWER OFF (apagado), conecte el osciloscopio y el oscilador como se muestra en la Fig. 7-14. ● Ponga la unidad en el modo de reproducción normal. ● Conecte la alimentación del oscilador y ajuste su salida a una seùal de 1,2kHz, 2Vp-p. Nota : Algunos osciladores descargan una tensión CC cuando se conecta su alimentación. Por lo tanto, se recomienda conectar el oscilador después de haber conectado su alimentación.
	50mV/div CH1 (X) 5mV/div CH2 (Y) (sonda 10 : 1)		Eje X : TP1 Patilla 3 (TRK. IN) Eje Y : TP1 Patilla 2 (TRK. ERR)	VR4 (TRK. GAN)	Diferencia de fase de 90é	● Ajuste VR4 TRK . GAN (ganancia de seguimiento) de forma que la figura de Lissajous se convierta en un circulo horizontal (diferencia de fase de 90ê).

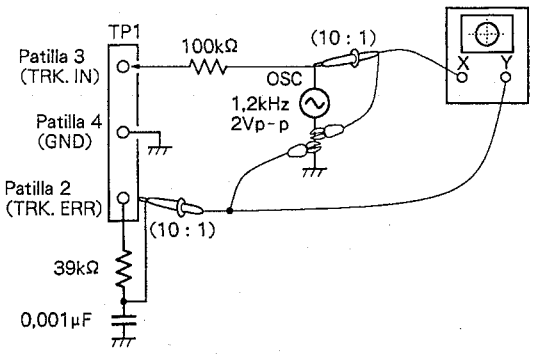


Fig. 7-14

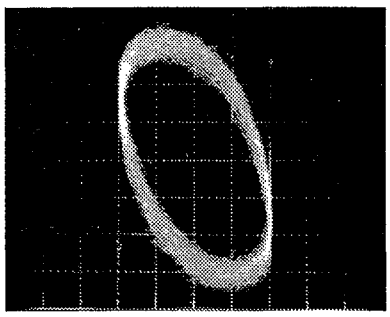


Foto 7-13
Ganancia sobrecompensade

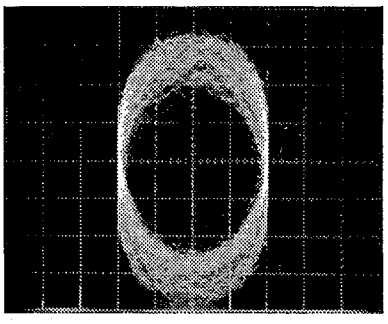


Foto 7-14
Ganancia óptima

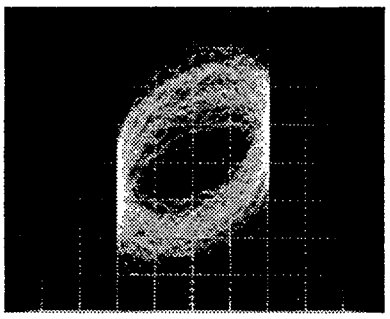
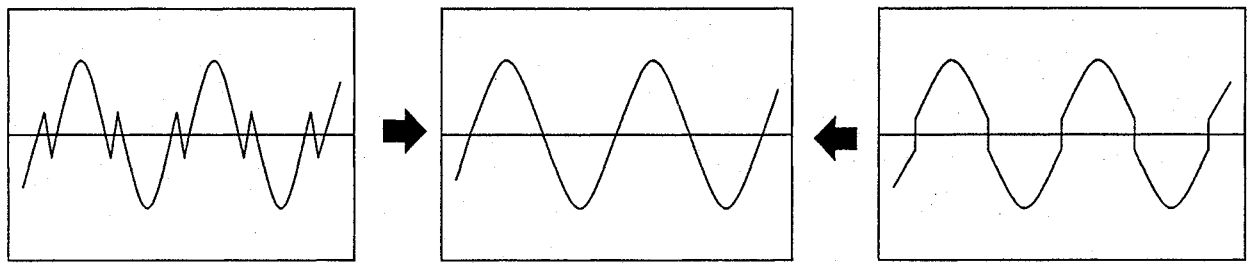


Foto 7-15
Ganancia subcompensade

N° de paso	Ajuste del osciloscopio V	Ajuste del osciloscopio H	Puntos de prueba	Puntos de ajuste	Itemes de comprobación/ Especificaciones de ajuste	Procedimiento de ajuste
11	**Ajuste de la frecuencia de oscilación libre del oscilador controlado por tensión (VCO)**					
			TP2 Patilla 2 (PLCK)	VR8 (VCO. ADJ)	4,275 ± 0,025MHz	● Ponga la unidad en el modo de prueba. (※) ● Cortocircuite ASY y GND con un ⊖ destornillador a algún objeto similar. (※) ● Conecte un frecuencimetro capaz de medir frecuencias de más 10MHz a la patilla 2 de TP2. ● Ajuste VR8 (ajuste del VCO) hasta que el frecuencimetro indique 4,275 ± 0,025MHz.
12	**Método para confirmar el carácter S (error de enfoque)**					
			TP1 Patilla 6 (FCS. ERR)			● Ponga la unidad en el modo de prueba. (※) ● Conecte a masa la patilla 5 de TP1 (ganancia de enfoque). ● Observe la forma de onda de salida de la patilla 6 FCS. ERR de TP1 (error de enfoque) al presionar la tecla TRACK FWD (▷▷|).
13	**Ajuste de MSB**					
	5mV/div	0.2msec / div	JA1 terminal LINE OUTPUT (canal derecho)	VR9	Onda senoidal	● Ponga la unidad en el modo de reproducción normal. ● Reproduzca la canción 20 (− 60 dB, 1kHz, canales izquierdo y derecho) del disco de prueba (YEDS-7). Conecte el osciloscopio a el canal derecho del terminal LINE OUTPUT (JA1), y observe la forma de onde de salida de audio. ● Ajuste VR9 MSB (canal derecho) hasta obtener una forma de onda senoidal en el osciloscopio.
			JA1 terminal LINE OUTPUT (canal izquierdo)	VR10	Onda senoidal	● Ajuste VR10 (canal izquierdo) de la misma forma.

● Forma de onda de la distorsion del punto de intersección del eje con cero



NG OK NG

※ : Consulte la página 56.

8. FOR PD-7300/HEM, HB, SD AND PD-7300-S/HEM TYPES

NOTES :
- Parts without part number cannot be supplied.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

8.1 CONTRAST OF MISCELLANEOUS PARTS

The PD-7300/HEM, HB, SD and PD-7300-S/HEM types are the same as the PD-7300/KU/CA type with the exception of the following sections.

Mark	Symbol & Description	Part No.					Remarks
		PD-7300/KU/CA type	PD-7300/HEM type	PD-7300/HB type	PD-7300/SD type	PD-7300-S/HEM type	
⚠	Strain relief	CM-22C	CM-22B	CM-22B	CM-22B	CM-22B	
	Display screen	PAM1323	PAM1305	PAM1305	PAM1323	PAM1305	
	Connection cord with mini plug	PDE-319	・・・・・	・・・・・	・・・・・	・・・・・	
	CD packing case	PHG1352	PHG1309	PHG1309	PHG1309	PHG1353	For packing
⚠	AC power cord	PDG1015	PDG1003	PDG1004	PDG1013	PDG1003	
	Operating instructions (English)	PRB1103	・・・・・	PRB1103	PRB1103	・・・・・	
	Operating instructions (English/French/German/Italian)	・・・・・	PRE1082	・・・・・	・・・・・	PRE1082	
	Operating instructions (Spanish)	・・・・・	・・・・・	・・・・・	PRC1012	・・・・・	
	Operating instructions (Spanish/Portgauese/Swedish/Dutch)	・・・・・	PRF1020	・・・・・	・・・・・	PRF1020	
⚠	Power transformer (AC120V)	PTT1109	・・・・・	・・・・・	・・・・・	・・・・・	
⚠	Power transformer (AC220V,240V)	・・・・・	PTT1110	PTT1110	・・・・・	PTT1110	
⚠	Line voltage selector (AC110V/120-127V/220V/240V)	・・・・・	・・・・・	・・・・・	PSB1002	・・・・・	
⚠	Power transformer (AC110V/120-127V/220V/240V)	・・・・・	・・・・・	・・・・・	PTT1111	・・・・・	
◉	Main board assembly	PWZ1641	PWZ1676	PWZ1676	PWZ1676	PWZ1676	
	Headphone board assembly	Non supply	Non supply	Non supply	Non supply	Non supply	
	Transformer board assembly	Non supply	Non supply	Non supply	Non supply	Non supply	
	Switch board unit	Non supply	Non supply	Non supply	Non supply	Non supply	
	D-OUT SW board assembly	Non supply	Non supply	Non supply	Non supply	Non supply	
	Function board assembly	Non supply	Non supply	Non supply	Non supply	Non supply	
	Washer	ABE1009	ABE1009	ABE1009	ABE1009	・・・・・	
	Headphone konb	PAC1370	PAC1370	PAC1370	PAC1370	PAC1402	
	Select button	PAC1373	PAC1373	PAC1373	PAC1373	・・・・	
	Select button (S)	・・・・・	・・・・・	・・・・・	・・・・・	PAC1409	
	Power button	PAC1372	PAC1372	PAC1372	PAC1372	PAC1299	
	O/C button	PAC1374	PAC1374	PAC1374	PAC1374	・・・・・	
	O/C button (S)	・・・・・	・・・・・	・・・・・	・・・・・	PAC1410	
	Track button	PAC1375	PAC1375	PAC1375	PAC1375	・・・・・	
	Track button (S)	・・・・・	・・・・・	・・・・・	・・・・・	PAC1411	
	Play button assembly	PAD1049	PAD1049	PAD1049	PAD1049	・・・・・	
	Play button (S) assembly	・・・・・	・・・・・	・・・・・	・・・・・	PAD1050	
	Front panel assembly	PEA1002	PEA1002	PEA1002	PEA1002	PEA1003	
	Tray name plate	PNW1525	PNW1525	PNW1525	PNW1525	・・・・	
	Tray name plate (S)	・・・・・	・・・・・	・・・・・	・・・・・	PNW1552	
	Bonnet	PYY1071	PYY1071	PYY1071	PYY1071	PYY1077	
	Collor	・・・・・	・・・・・	・・・・・	・・・・・	PNW1435	

MAIN BOARD ASSEMBLY (PWZ1676)

The main board assembly (PWZ1676) is the same as the main board assembly (PWZ1641) with the exception of the following sections.

Mark	Symbol & Description	Part No.		Remarks
		PWZ1641	PWZ1676	
	C190	CCCSL101J50	• • • • •	
	C191	CKCYF103Z50	• • • • •	
	R181	RD1/6PM102J	• • • • •	
	R180	RD1/6PM244J	• • • • •	
	JA4,JA5	RKN1004	• • • • •	
	D16 – D18,D23	1SS254	• • • • •	

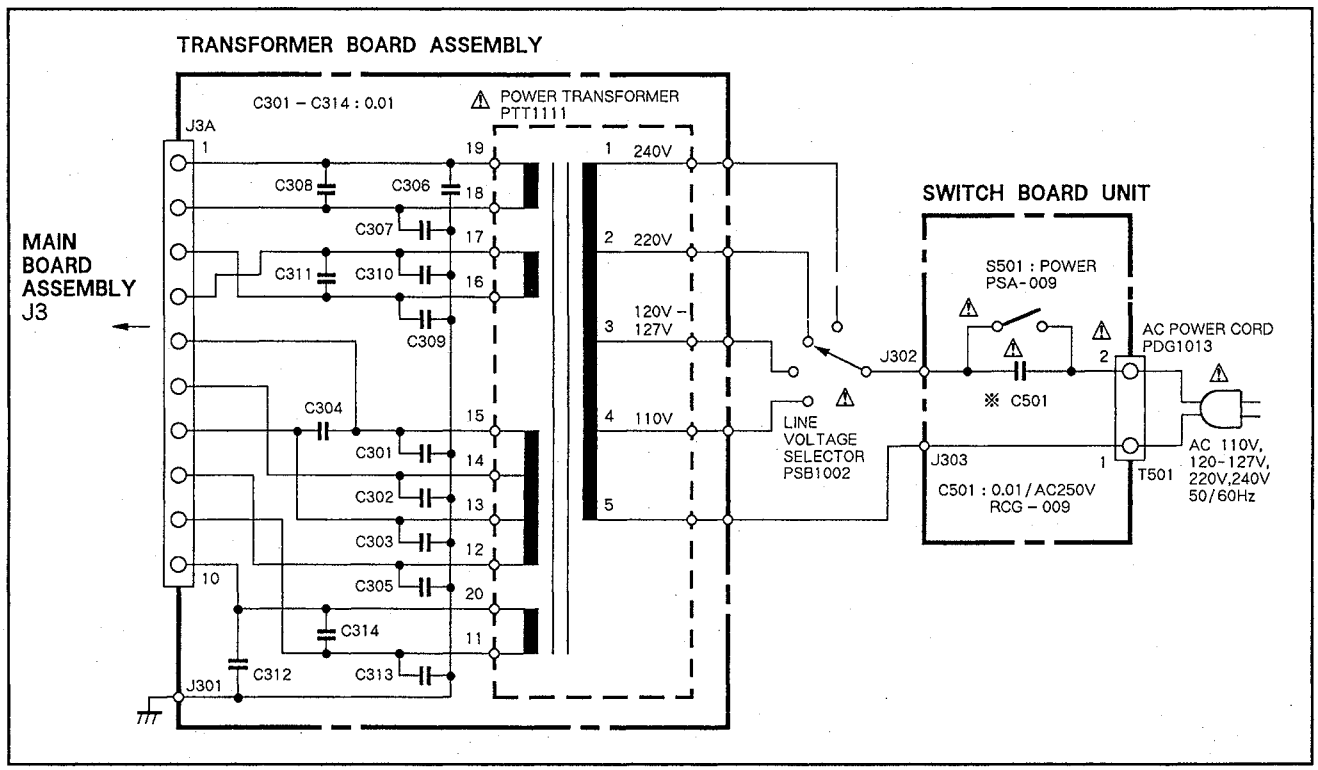
HEADPHONE BOARD ASSEMBLY

The headphone board assembly of (PD-7300/HEM, HB, SD and PD-7300-S/HEM types) are the same as that of PD-7300/KU/CA type with the exception of the following sections.

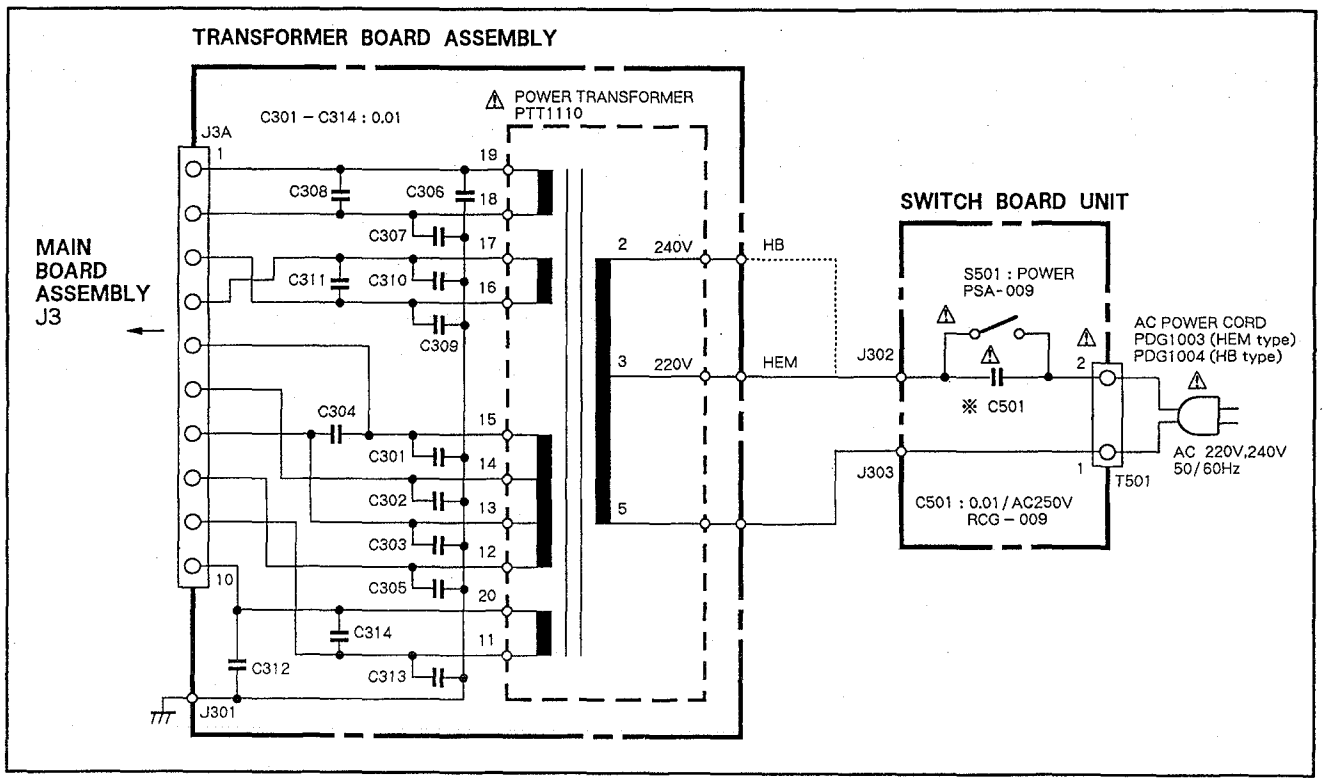
Mark	Symbol & Description	Part No.		Remarks
		PD-7300/KU/CA type	PD-7300/HEM, HB, SD and PD-7300-S/HEM type	
	L404,L405	• • • • •	LAU010K	

8.2 TRANSFORMER BOARD ASSEMBLY AND SWITCH BOARD UNIT FOR SD AND HEM/HB TYPES ARE SHOWN BELOW

● FOR SD TYPE



• FOR HEM AND HB TYPES



● Line Voltage Selection

Line voltage can be changed with the following steps.

1. Disconnect the AC power cord.
2. Remove the bonnet case.
3. Change the connection wires from the power transformer (pin 2 (240V) and pin 3 (220V) wires) to the SWITCH BOARD UNIT (J302) as shown in the schematic diagram.
4. Stick the line voltage label on the rear panel.

Description	Part No.
220V label	AAX-193
240V label	AAX-192

9. SPECIFICATIONS

1. General

Type ..... Compact disc digital audio system
Power requirements
U.K. model ..... AC 240V, 50/60Hz
U.S., Canadian models ..... AC 120V, 60Hz
Other models ..... AC 110/120—127/220V/240V (switchable) 50/60Hz
Power consumption
U.K., U.S., Canadian models 17W
Other models 17W
Operating temperature ..... +5°C—+35°C (+41°F—+95°F)
Weight 6.0kg (13lb, 4oz)
External dimensions ..... 420(W) × 320(D) × 123(H)mm 16-1/2(W) × 12-5/8(D) × 4-7/8(H) in.

2. Audio section

Frequency response ..... 2Hz—20kHz (±0.5dB)
Signal-to-noise ratio ..... 110dB or more (EIAJ)
Dynamic range ..... 98dB or more (EIAJ)
Channel separation ..... 106dB or more (EIAJ)
Total harmonic distortion ..... 0.0025% or less (EIAJ)
Output voltage 2V
Wow and flutter ..... Limit of measurement (±0.001% W.PEAK) or less (EIAJ)
Number of channels ..... 2 channels (stereo)
Digital output ..... Coaxial output: 0.5 Vp-p (75Ω)
Optical output: −15dBm to −20dBm (wavelength 660nm)

3. Output terminal

Optical digital output terminal
Coaxial digital output terminal
Control input/output terminals (U.S. and Canadian models only)
Audio line output terminal
Headphone jack (with volume control)

4. Functions

- Play
- Pause
- Stop
- Manual search
- Track search
- Index search
- Direct selection
- Single track repeat
- All track repeat
- Programmed repeat
- Random play repeat
- Programmed random play repeat
- Music Window repeat
- Programmed playback (up to 24 tracks)
- Pause program
- Program check
- Program correction
- Program clear
- Add-on program
- Auto program editing
- Time fade editing (Fade time variation)
- Music Window (Fade time variation)
- One touche fade (Fade time variation)
- Digital level control (remote control)
- Random play
- Programmed random play
- Auto space
- Timer start
- Display off

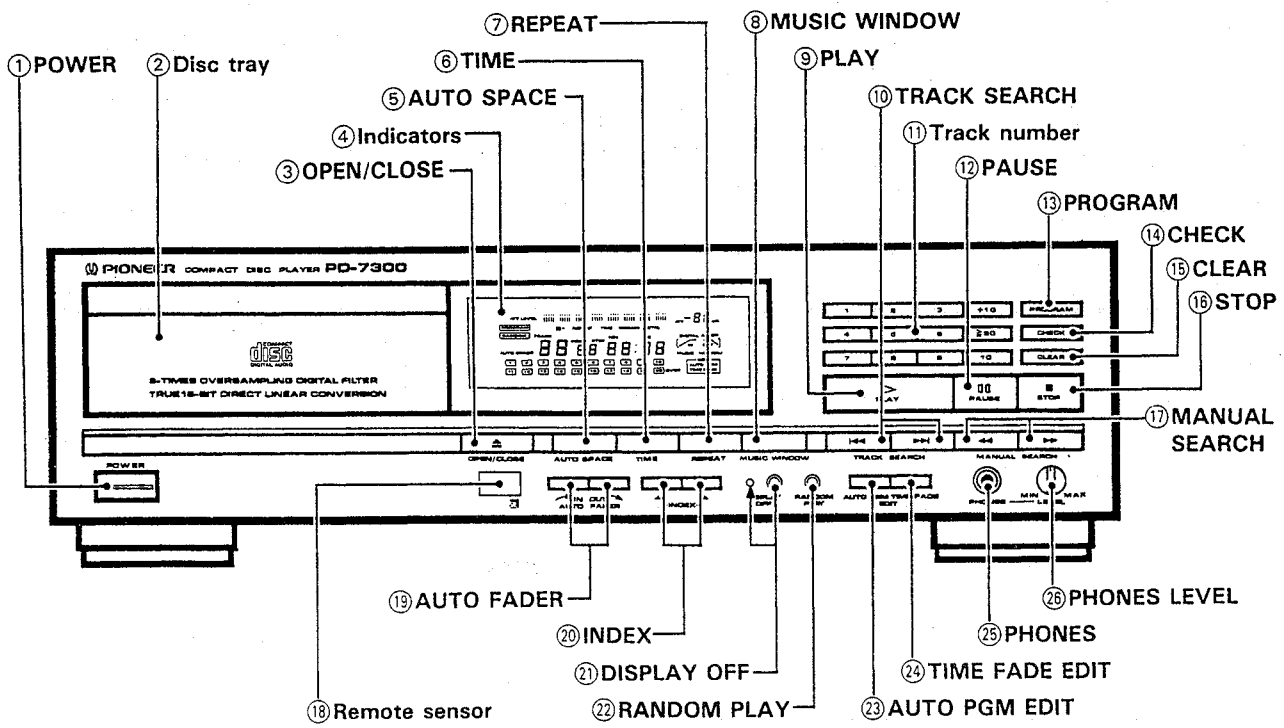
5. Accessories

- Remote control unit 1
- Size AAA/R03 dry cell batteries 2
- Output cable 1
- Control cord 1
  (U.S. and Canadian models only)
- Operating instructions 1

NOTE:
Specifications and design subject to possible modifications without notice, due to improvement.

10. PANEL FACILITIES

FRONT PANEL



① POWER switch

Press to turn power to the unit ON and OFF.

② Disc tray

This is where the disc is set. When power is switched ON and the OPEN/CLOSE key is pressed, the tray is ejected forward. To insert the tray, press the OPEN/CLOSE key, or lightly push the tray in with your finger. With the disc tray open, pressing the PLAY key or track number key will close the disc tray and start playback.

③ OPEN/CLOSE key (⏏)

Press when you wish to eject or load a disc. Each time the key is pressed, the tray is alternately pushed out or pulled in.

④ Indicators

See page 10.

⑤ AUTO SPACE key

During playback, there will be a pause of about 3 seconds before the next track is played.

⑥ TIME key

This switches the indicator display mode. Each time the key is pressed, the display will show TIME, REMAIN, ALL REMAIN and TOTAL respectively. (For a description of each display mode, refer to the item concerning the indicator.)

⑦ REPEAT key

Press this key for repeat playback. Pressing the key once, twice, or three times will change the repeat mode from single track repeat, all tracks repeat, and repeat playback cancellation.

⑧ MUSIC WINDOW key

Use this key to specify the desired sections (music windows) of a track.

⑨ PLAY key/Indicator (▷)

Press to begin playback, and to cancel the pause mode.

⑩ TRACK SEARCH keys (▶▶|, |◀◀)

During playback (or programmed play) or pause, these keys are used to search for the desired track. The search keys are pressed to advance or reverse the player to the next or previous track respectively.
When pressed during stop mode, the playing time of the displayed track will be displayed in the program order.

⑪ Track number keys (1 to 10, +10 and ≧20)

- These keys are used to specify the track numbers (tracks 1 to 99) for direct track selection or program entry.
- During auto program editing or time fade editing, the keys are used to specify the time period (in minutes).
- These keys are also used to set the fade-in and fade-out times (0 to 9 seconds).

⑫ PAUSE key/Indicator (▯▯)

Press to temporarily interrupt playback. When pressed again, the pause mode is cancelled and playback resumes.

⑬ PROGRAM key

This is used to program tracks to play in a desired sequence.

⑭ CHECK key

Press this key to check the contents of a program that has been entered. Starting with step 1 of the program, the next program step will be shown each time the key is pressed.

⑮ CLEAR key

Press this key during program entry, music window entry, or playback to clear the last program step.
This will also cancel the time fade editing mode.

⑯ STOP key (■)

Press to stop playback. When pressed, the player goes into stop mode and all operations stop.
Press to clear a program. When pressed during stop mode, the program stored in memory is cleared.

⑰ MANUAL SEARCH keys (▶▶, ◀◀)

When the player is in play or pause modes, these keys are pressed to perform fast forward or fast reverse operations, to allow manual searching. These operations are only carried out during the time either key is pressed.

⑱ Remote sensor

⑲ AUTO FADER keys

IN : Press this key to start playback with fade-in sound. (Effective only during playback pause mode and fade-out.) Press this key when setting the fade-in operation time (0 to 9 sec.) (Effective only during stop mode.)

OUT : Press this key for fade-out sound. (After fade-out is completed, the unit will enter pause mode.) Press this key when setting the fade-out operation time (0 to 9 sec.) (Effective only during stop mode.)

⑳ INDEX search keys (←, →)

Seaches, during playback or pause, for the music section of a track or the track index. When pressed, the unit will return to the previous index or advance to the next index.

㉑ DISPLAY OFF key/Indicator

Press this key to turn off the indicator display.
The unused circuits are turned off to prevent any detrimental effect on sound quality.
When an operation key is pressed, the display will go on for a few seconds. When not in playback modes (STOP, PAUSE, etc.), the display will be on.

㉒ RANDOM PLAY key

Press to begin random playback.

㉓ AUTO PGM EDIT key

Press to program a tune which may be played back within a specified time.

㉔ TIME FADE EDIT key

Press this key when ending play at a desired time with fade out.

㉕ PHONES (headphones) jack

When you wish to sue headphones, insert the plug for the headphones into the headphone jack.

㉖ PHONES LEVEL control knob

Use to adjust the level of sound when using headphones. Turning the knob to the right increases the sound level.

Indicators

ATT LEVEL	: The volume level of fade-in, fade-out, and digital level control is displayed.
PROGRAM	: Lights during the program mode.
RANDOM	: Lights during random playback.
AUTO SPACE	: Lights during auto space playback.
1 - REPEAT	: Lights during repeat playback of one track.
REPEAT	: Lights during repeat playback of all tracks (or programs).
TRACK 1 – 20, OVER (Music calendar)	: Display the current track number (during normal playback and programmed playback) or the track being programmed during programming operation. The lower figures light up in accordance with the number of tracks recorded on the disc, and the numbers of the tracks which have been played are deleted in order. (During entering a program, and programmed playback only the programmed tracks light.) For 21 or over, OVER will light.
INDEX	: Displays the index * number of the music section of a track or the track division.
STEP	: Displays the program steps.
TIME/REMAIN/TOTAL	: Changes each time the TIME key is pressed.
● TIME	: Displays the track number of the track being played (TRACK) and the elapsed time (minutes and seconds).
● REMAIN	: Displays the remaining time on the track being played. When the TIME key is pressed again, the remaining time on the disc will be displayed.

- TOTAL : Displays the total number of tracks on the disc (TRACK) and the overall playback time (minutes and seconds).
  During playback, the display goes on for about 5 seconds before changing to the TIME display.

During programmed playback operation, displays the playing time, the remaining time of the track being played and the total program steps (TOTAL). During time fade editing mode playback, TIME-FADE-REMAIN will be displayed instead of remaining time on the disc.

MIN (minute) : Displays the minutes of the elapsed time, total playback time, and remaining time.

SEC (second) : Displays the seconds of the elapsed time, total playback time, and remaining time.

ATT : Dispalys the volume decrease (−dB) of fade-in, fade-out and digital level control.

IN : Lights during fade-in operation.

OUT : Lights during fade-out operation.

MUSIC WINDOW : Lights when a music window has been programmed.

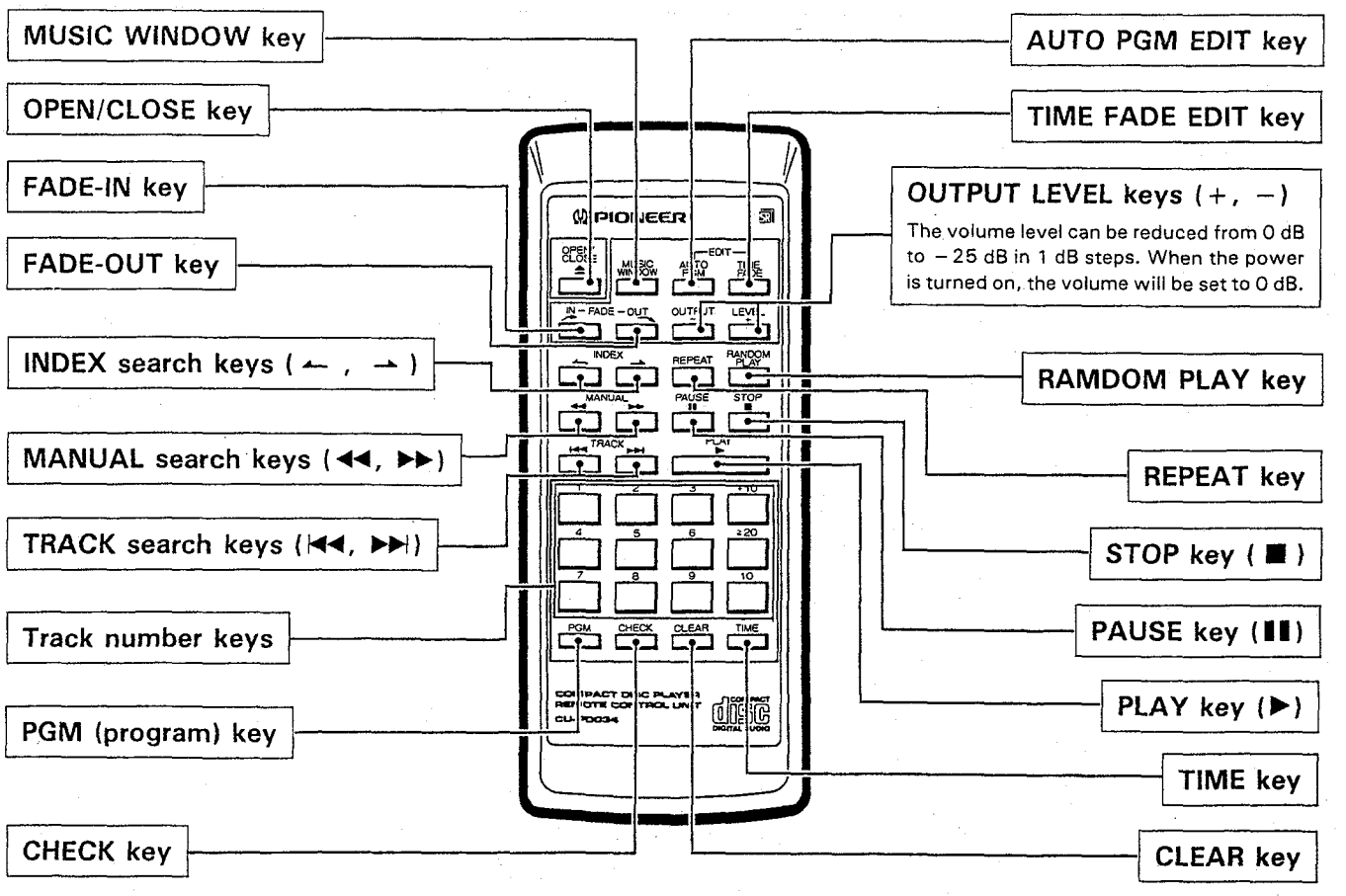
AUTO PGM : Displays when auto program editing is set or used.

TIME FADE : Displays when time fade editing is set or used.

* The INDEX is a signal which is recorded within a track to indicate division of the track into separate tunes and items of music.

REMOTE CONTROL UNIT

Refer to player front panel section regarding other key functions not specified here.


MUSIC WINDOW key
OPEN/CLOSE key
FADE-IN key
FADE-OUT key
INDEX search keys (← , →)
MANUAL search keys (◀◀, ▶▶)
TRACK search keys (|◀◀, ▶▶|)
Track number keys
PGM (program) key
CHECK key
AUTO PGM EDIT key
TIME FADE EDIT key
OUTPUT LEVEL keys (+, −)
The volume level can be reduced from 0 dB to −25 dB in 1 dB steps. When the power is turned on, the volume will be set to 0 dB.
RAMDOM PLAY key
REPEAT key
STOP key (■)
PAUSE key (▮▮)
PLAY key (▶)
TIME key
CLEAR key

Digital Level Controller (Volume adjustment)

By pressing the LEVEL −/+ key, the volume level can be controlled from 0 dB to −25 dB in 1 dB steps via digital circuit processing.

- To increase the volume — Press the LEVEL [+] key. (If the level is 0 dB, there will be no change.)
- To decrease the volume — Press the LEVEL [−] key. (If the key is held down, the level will stop at −25 dB.) The level will be displayed on the ATT LEVEL indicator and ATT indicator.

NOTE:
The headphone level can also be adjusted at the same time. However, the volume of the digital output from the DIGITAL OUT terminals cannot be adjusted.

NOTE:
Conventional Pioneer remote control units (with the SR mark) and audio video programmable remote control units do not have the +10 and ≧20 keys. Therefore, direct track selection from track 11 on, and programs with more than 11 tracks cannot be entered with these remote control units. Operate the audio video programmable remote control unit by using the learning function.

REAR PANEL

DIGITAL output selector

This selects the rear panel's output terminal that is to be used. Select the output terminal type that is to be used.

ON : When the audio and digital (coaxial or optical) output terminals are used simultaneously.

OFF : When the only audio output terminal is used. The operation of unused circuits is stopped to prevent them from affecting sound quality.

NOTE:
The digital level of fade-in and fade-out cannot be controlled through the digital output terminal.

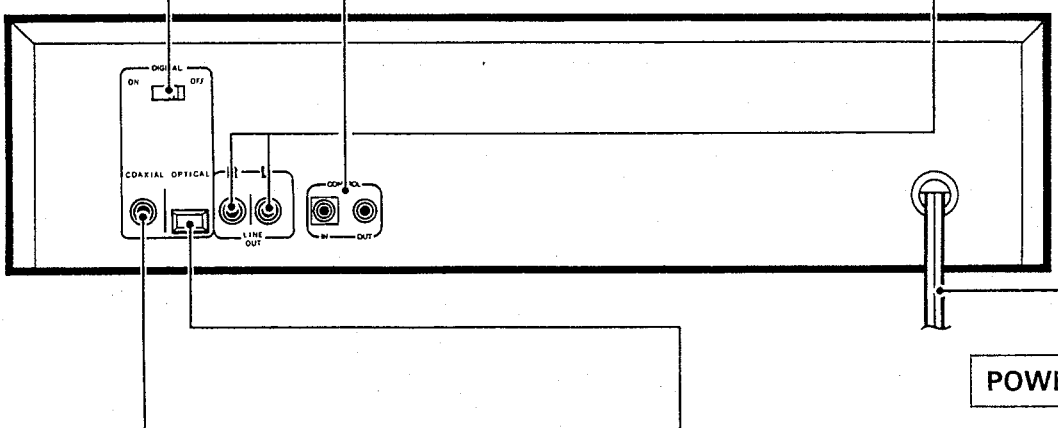
CONTROL IN terminal (U.S. and Canadian models only)

This terminal is for inputting the remote control signals relayed from an amplifier with a sensor for receiving control signals from a remote control unit and carrying the Pioneer SR mark. For instructions regarding connection and operation, please refer to the operating instruction manual for your stereo amplifier.

CONTROL OUT terminal (U.S. and Canadian models only)

This terminal is for further relaying remote control signals to other components carrying the Pioneer SR mark. Please connect to the control input terminal of the other component.

LINE OUT terminals



POWER CORD

COAXIAL digital output terminal

This terminal allows output of disc audio data and subcode (signals which can be recorded together with the audio signal) as digital signals.

OPTICAL digital out terminal

This terminal allows optical output of disc audio data and subcode (signals which can be recorded with the audio signal) as digital signals.